MINOR ARTS

·C.G.LELAND·

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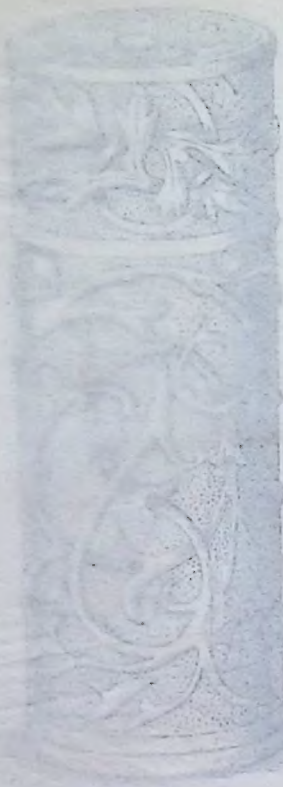

THE MINOR ARTS.

PORCELAIN PAINTING, WOOD-CARVING, STENCILLING, MODELLING, MOSAIC WORK, &c.

BY

CHARLES G. LELAND.

London:
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R. Clay, Sons, and Taylor,
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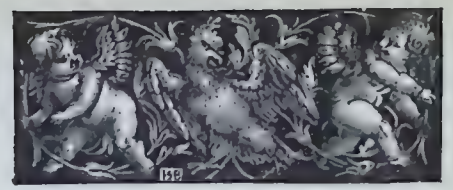


PREFACE.

THIS little work is offered to the public with much more serious intention than that of affording amusement to idlers. It professes to teach in a simple, practical manner the processes of several minor decorative arts which may prove sources of profit or culture. Not only has decoration extended of late years in many directions where it was before unknown, but there is also a constantly growing demand for that which is *made by hand* as being more truly artistic and interesting than the most finished results of mere machinery. Were there an universal and established preference for artistic handwork to that produced by machinery, we should have advanced far in knowing how to obtain employment for those who are deprived of it by labour-saving inventions. "Man is properly the only object which interests man," and a great part of the real interest which an intelligent mind takes in a work of art is in *directly* perceiving the skill or character of the maker.

A wall, frescoed or painted in any way with taste, however rudely, in the Roman fashion, should be preferable to one ornamented with wall-paper; and the same may be said relatively of wood-carving and of jewellery, in both of which machine work, by its very monotony of perfect finish, is simply wearisome. But whether handwork should or should not be preferred, there can be no doubt that if it were there would be employment found for many thousands who are now idle. Machinery concentrates profit in the hands of a few, and it may properly do this in all matters in which it has succeeded in conducing to comfort. But it has never succeeded in a single department of art in producing anything but soulless copies, and by its enormous dissemination of these it has greatly retarded true art. It is, in fact, to a higher standard of taste in manufactures that our country must in future look for her industrial development, and this will not be attained unless there shall be a great increase in handwork in art. This is becoming such a serious matter that I cannot but feel that I fulfil a duty in endeavouring to promote a practical knowledge of such decorative art, though in ever so small a degree.

It must be granted that while there can be no doubt that our art schools are doing much to develop taste, it is not less true that every effort should be made to prepare scholars for these schools; that is

to say, to awaken a desire among the young or the unpractised to do something in art. Both of these wants are strictly kept in view in this book. Among the poorer classes there are very few who know how to make anything which would be a resource when in an unexpected strait of poverty and idleness, and yet several of the small arts which are treated of in this book can, with proper resolution, be mastered by the great majority of people in a short time, with the certainty of affording the means of living. It is very true that no *art* in detail can be taught in a chapter, but the author speaks from experience when he asserts that the perfect *method* of the *processes* of making boiled leather-work, wood-carving, mosaic laying, moulding, and some other arts, may be so distinctly set forth in a few pages as to enable any intelligent youth to produce something creditable and that with this first experience gained he will be able to proceed without difficulty. There was a time when the practice of these minor arts was regarded as mere pastime if not waste-time, but at the present day anything which will supply, at a profit, the ornamented panels or tiles, or furniture covers of stamped leather which are being freely introduced into furniture, can claim to be something, better than mere amusement. There is, as I have said, a class of educated purchasers rapidly springing up who prefer *hand-made* work to merely artificial kinds,

and I have throughout constantly kept them in view, and urged the pupil to impress individual character upon his work as much as possible. I have done this assuming that he may intend to perfect himself in the art in hand, whatever it be, and possibly become an artist in it.

The leather-work of which I treat in the introductory chapter is not simply the common art of making leaves and flowers. I have read several works on so-called leather-work which are all confined to this very small branch of the subject, and in which the highest claim put forth for the results is that they greatly resemble wood-carving. The leather-work chiefly treated of in this book is the old *cuir bouilli*, or boiled and hardened *solid* leather-work, which was so generally made till within two centuries, especially in Italy and the East, specimens of which now sell for such enormous prices. This work has a character of its own, imitates nothing, is applicable to innumerable practical and ornamental purposes, can be very easily made with a few days' practice at almost nominal expense, and can be sold at a high profit. As this work is written with a view to encourage hand-work, it will not be deemed out of place should I point out the curious fact that the current system of buying goods on credit by the consumer is very injurious to art. The monopoly enjoyed by the large manufacturers of machine-

made goods is due simply to the fact *that they can give credit.* Take, for instance, a gas-fitter, called to supply a few brackets. Let us grant that he has taste and would make something beautiful. But if he is not to be paid till Christmas or "Christmas a year," he will simply buy cheaply some of the ugly objects which large gas-fitting houses keep in stock, manufactured by thousands, produced very cheap, and subject to a long discount or a long credit. It is not true that the tradesman or mechanic is incapable of becoming an artist. I have found him as a rule ambitious and capable, but always kept back and discouraged by the delay which maketh the heart sick, and thereby encouraged to supply cheap stuff. Pay cash, and the men who embellish your houses will do their very best, and it will be better for the consumer, the artist, and for Art.

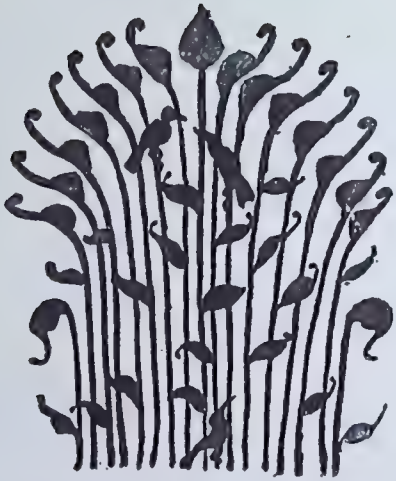
It is greatly to be desired that in every village, or in every district of the larger towns, ladies or gentlemen able to draw, and who are interested in providing employment or in advancing culture among the poor, would found little societies or schools for teaching the arts set forth in this book, or similar ones. It would not be an expensive undertaking. A room with tables and chairs, a supply of cheap leather and leather waste, old newspapers, wood, sheet-brass, paste, glue, and tools would be easily provided, and the school, if properly managed, soon pay its ex-

penses, and prepare and qualify with taste applicants for many trades and callings. Such schools would supply both amusement and instruction for old and young, and effectually promote an elementary and general knowledge of art. Drawing alone is not sufficiently attractive for the ignorant and uneducated, but there are few who will not practise one or more minor arts. It would be well if circles, clubs, or societies could be formed among young people of every class for the same purpose and for mutual instruction. I venture to assert that with the instructions given in this work, and a little knowledge of the simplest elements of drawing, the majority of pupils would, in a few weeks or months, attain a practical mastery of all of which it treats. I shall be only too happy to communicate by letter to any one forming such clubs or schools, and give any advice in my power as to their organization, or any minor details. For this reason, that I have the general establishment of such schools, classes, or circles near at heart, I venture to commend my book to all who are specially interested in education, or with supplying school libraries and small prizes, or gift-books. It was with special reference to popular education, and to establishing such elementary classes, that I began years ago a series of books on these arts, of which this volume is a partial *résumé*. Should it be productive of any good in the better qualifying the ignorant for any calling, or in

making busy those who would have been idle, my utmost hopes as regards it will have been realised.

In writing this little work I have been aided by the kind assistance of many friends. Among these was Mr. George J. Robinson, who greatly improved the chapters on Mosaic and Stencilling, and at whose suggestion I was induced to specially advocate hand-labour. Also Mr. Karl Krall, of Barkentin and Krall, Regent Street, goldsmiths and metal-workers to the Ecclesiological Society. This firm make a specialty of artistic hand-work, and deserve credit for their efforts to create a taste for it. For assistance in what I have written on Modelling and Casting, my thanks are due to Mr. H. MacDowell, superintendent of the art-department at Howell and James's.

CHARLES G. LELAND



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THE MINOR ARTS.

CHAPTER I.

LEATHER-WORK.—CUIR BOUILLI—SEWED LEATHER —SHEET LEATHER.

THE art of making useful or ornamental objects from leather has three divisions, (1) Solid or pressed work, known as *cuir bouilli*, in which leather of all kinds, after having been boiled and macerated, or rendered perfectly soft, is moulded, stamped, or otherwise worked into form; (2) Sewed leather, in which thin sheets of leather are treated as cloth, with the needle; and (3) Sheet leather work, confined principally to imitations of flowers, leaves, and fruit, which are cut out of thin sheets, damped, and marked with instruments. This latter is the only kind of leather work in general use at present. Till within a century, *cuir bouilli*, or boiled leather, so prepared that when dry it became hard as wood, yet perfectly elastic, was employed for many purposes, and it is with the revival of this elegant art that I shall chiefly deal.

Materials and Tools.—For the beginner these are very inexpensive, since many pretty and profitable objects can be made, of bookbinder's waste leather scraps, costing perhaps 2*d.* per pound, combined with waste paper and glue, dextrine, or flour paste. The more expensive material is sold in skins or large sheets, two kinds being generally used, one called *skiver*, which is very thin and supple, costing from 3*s.* to 5*s.* per skin, the other, *basil*, of better quality and thicker, which may be had for a third more. For waste paper, old soft newspapers are best. *Dextrine* in powder, from which a very strong gum is made, may be had at any chemist's or grocer's for 8*d.* or 10*d.* a pound. As you progress you will need a glue made of shellac and naphtha, which is sold at oil-shops as "patent knotting," black dye or *good* ink, alum in powder, a little bi-chromate of potash, costing a penny an ounce, some wooden panels, if you can carve a little, a few button-moulds, and other inexpensive trifles. A great variety of cheaper waste stuff such as saddlers' and shoemakers' scraps, soft rags, fine sawdust, or plaster may be used at times in your work. For tools you will want a penknife and scissors, pencil and compasses, a tenpenny broad brush for spreading on paste or gum, a rag full of sand, tied up tightly so that the neck may serve as a handle, and patternmarkers, or wheels, both with and without the sharp points, such as are sold by shoemakers' furnishers. You will want sooner or later a few flat or half-round gouges for cutting out thick card-board ornaments. It is almost indispensable that you should be able to cut from wood a few very

simple tools. The skill required for making these is not much more than that required for sharpening a lead-pencil, and ordinary kindling wood will supply the material. Many of these can be bought made of bone, but it is better to make them for yourself. In

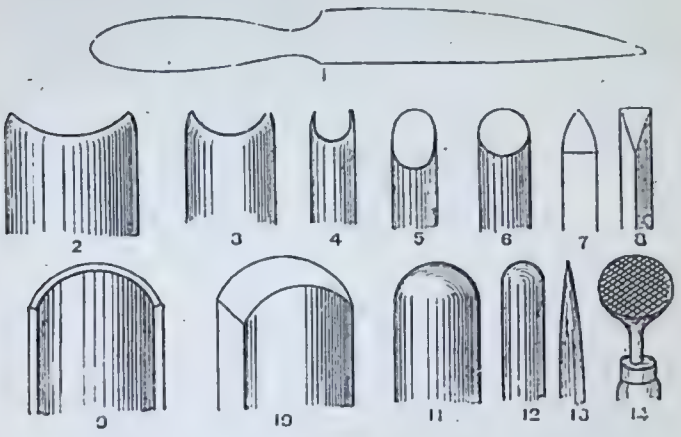

FIG. 1.

Fig. 1, No. 1 is used for scraping, marking, working the leather into corners and drawing lines. It has a very dull knife edge and a point. Nos. 2, 3, 4, 5, and 6, are wooden chisels and gouges easily made with the steel tools. They are used for stamping and working patterns. No. 14 is an old-fashioned office seal with crossed lines. You may make it by smoothing the end of a rounded stick and cutting the lines. It is used for stamping the back-ground of your work. For the same purpose you may use any wood-carvers' punches, sold at 6*d.* each.

You can make beautiful leather-work without

knowing how to carve wood, but with a few days' practice you could teach yourself to cut simple lines or leaves *into* the wood, thereby making moulds into which to press the softened leather. To do this you will require only half-a-dozen flat and "half-round" gouges, and a chisel or two. A glue made of shellac and naphtha is indispensable for hardening articles of pure leather. It is applied on the back.

The First Experiment.—The external surface of leather-work is almost always made from sheets or skins, the interior may consist of leather-rag pulp, or paper and paste, or anything which can be moulded and hardened. It may also be observed that the ornaments on the surface may be made by working with tools such as punches and wheels, or by stamping and printing with dies and moulds. *Cuir bouilli* is leather boiled to a pulp or softened in cold water. It will harden of itself when dry, but becomes like wood or horn when boiled with alum or "backed" with shellac and naphtha glue. The maceration may be effected in any pot or pan. The water may be hot or cold, and the leather may be kept in it from ten minutes to ten hours, according to its quality, hardness, and the purpose for which it is intended. Of alum, put a table-spoonful to a pint of water. Salt may be used if you cannot obtain alum. When it is meant to be covered with fine sheet leather, the interior or the hardened mass of pulp is called a *core*, from *cœur*, a heart. This core, which is the solid shape without finish, may be as well made from papier mâché. This is nothing but layers of soft waste paper, spongy newspapers being the best,

between which flour paste, well stiffened with dextrine or glue, is laid on with a broad brush. The papier mâché for a core may be mixed with leather pulp, in which state it is called *carton cuir*, or card-board leather, or with soft rags or cotton-waste, saw-dust, plaster of Paris, and sand or powdered cocoa-nut shell. Anything which will combine with a fibrous substance and size or paste, so as to be moulded into shape and become hard, may be used for a core, but for the beginner, leather pulp or papier mâché are easiest to manage.

Begin by making a simple card-receiver. For a mould take a common plate or one of the saucer-like plates used for china-painting, and which are sold for a shilling. Now take a quantity of soft leather scraps

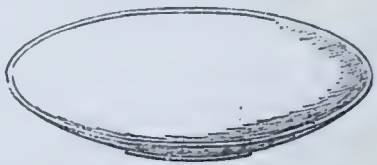

FIG. 2.

and soak them for ten or twenty minutes in hot alum water. Line your plate carefully with a piece of damp newspaper to prevent adhesion, and then lay your leather on this, piece by piece, patching it into a whole, and giving each as it is laid a slight coat with a broad brush of dextrine or glue and flour paste, pressing it very firmly down with your fingers and the sand-bag or sponge. Proceed till you have formed a leather plate inside or outside the china one, taking care that it be everywhere of the same

size. When it is the eighth of an inch in thickness, smooth it nicely with the sand-bag, let it dry for two or three days in a warm room, take it from the plate and trim the edges with scissors and sandpaper. This is the plain core. To make it of papier mâché, take soft newspaper, and with scissors cut out twenty round pieces, each a very little larger than the plate. Lay one on it and then paste or glue it, as before, and then another, and so on pasting them all together, pressing them down hard with fingers and sand-bag. In doing this you will find that a certain skill is acquired, and that in time you can mould the soft leather or paper and paste into any form, like wax. Trim the edges and remove it when dry.

To ornament the interior of either core, be it of leather or papier mâché, let us say with simple bosses or half-globes in the centre, you may take either half-round wooden button-moulds, or make them yourself from paper and paste, leather or wood. Put one in the centre of the plate inside, and range the others round it in a row, fastening them on with glue. In like manner you may make from sheets of papier mâché, as thin or thick as you like, rosettes, diamonds, circles, leaves, or any other ornaments.

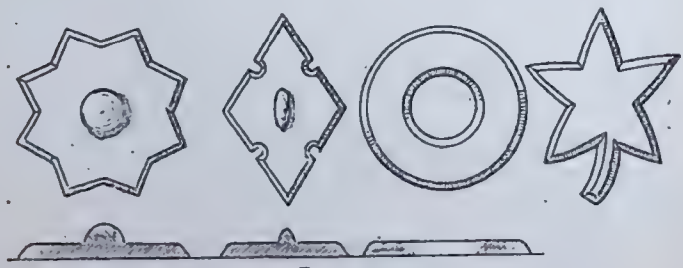

FIG. 3.

Or take a wreath for a pattern (Fig. 4). Make this by taking twenty round papers. As the wreath consists of four parts repeated, you may make them by doubling and redoubling the paper, and scissor

FIG. 4.

them out all at once. Then paste one on the other. Or you may paste twenty sheets of paper together, press them hard under a rolling-pin or press, dry them, draw your pattern on the cardboard thus formed, and

FIG. 5.

cut it out with a penknife, or with sharp gouges. Stitch or paste it to the core. Gothic letters, rings, and bands, figures of animals, men, flowers, or heraldic

monsters and designs may be thus made, and in as high relief as you please.

To finish the plate, take a round piece of *skiver* leather, one or two inches larger in diameter than the plate, steep it for a few minutes in hot water, and lay it on the core. Then, *beginning at the centre*, press the whole with your fingers and with a dry sponge on the core. As you proceed, work the sheet with your wooden or bone bodkins carefully into every corner, beginning with the centre, as the sheet will *draw* over the edges. As it draws, secure the inside lines. Wet the leather with a sponge as it becomes dry. After a while you will find the work easy, though it will give some trouble at the first trial. When the pattern is nice and clear on the surface, take your cross-marked stamp and with it indent all the background, or the flat surface between the ornaments. Keep some pine sticks by you while at this work, and cut their ends with knife or gouges into any shapes you may want to work the leather into "a queer corner."

When your card-tray is so far done, cover the back with glue and skiver, bring the edges of the front piece over it, smooth them down, glue them firmly, and it will be finished.

ORNAMENTATION OF DIFFERENT KINDS.

Before proceeding to new work, you would do well to repeat your card-receiver several times so as to acquire a practised hand. You will then be able to mould cups, goblets, and other objects, either on

china ones or by hand alone, out of boiled leather or paper and paste. To make a vase or pitcher, begin by making a base or foot of wood in this shape.

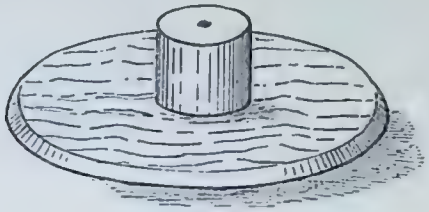

FIG. 6.

This may be made of two pieces screwed together. Then take your china vase, spread evenly over it your boiled leather or paper and paste, smooth it, and let it dry. Then with the point of a sharp knife

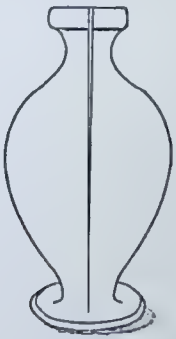

FIG. 7.

cut it down from top to bottom on one side, or, if necessary, into two or more pieces, as the shape may require. Then shell them off, and join them together carefully by stitching or glueing. Then attach the

body of the vase so made to the wooden base with glue, and cover the whole with skiver. Of course you may ornament this as you did the card-receiver. But there are different ways of ornamenting leather, such as staining, painting, and gilding. Light brown leather presents a beautiful appearance when contrasted with patterns of darker brown or black. Dark brown stain patterns may be made with bichromate of potash mixed with water. Do not forget that it is poison. Bookbinders produce dark-brown ornaments, bands, lines, simply by slightly heating brass stamps and branding the patterns on light-coloured leather. The surface pattern may be simply stained and the spaces between indented with the cross-lined stamp or dotted thickly with a bodkin or wood-carver's punch. Brass stamps may be made to order for a few shillings. But you may cut them out for heating and browning from tin or sheet brass with strong scissors or a file. Branding in lines may be done with brass rules or with the edge of a tooling wheel.

Bookbinders stain black by putting printers' ink on a stamp, heating it before application. You may paint black or other colours with good ink, or with wood-stains. An elegant ornamentation is *appliqué* work, made by cutting out leaves or any designs from coloured scraps of leather and gumming them on the skiver cover. You will find among bookbinders scrap pieces of all colours suited to this. A brown vase with a wreath of mingled green and scarlet, or scarlet and black leaves, is very effective. Remember that all patterns whatever may be executed either in

raised papier mâché, in printer's ink on a hot iron, in cut leather, in stains, in *appliqué*, by gilding with leaf or simply with gold powder. Such gold powder is now sold at a shilling a bottle, and it may be used with any gum and water. Finally, the most elegant and artistic method of all is by indenting and working leather sheets by hand with bone or ivory bodkins, dull wooden or bone gouges, and especially with the tooling-wheel, which is a most important implement. It is used not only to run lines and indent, but also to finish the edges of *appliqué* work after it has been gummed on. This wheel in its simplest form is merely a round disk or plate of brass or steel with a handle.

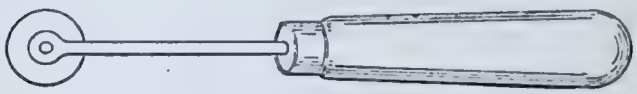

FIG. 8.

These wheels when used to press down or tool the outer edges of *appliqué* patterns gummed on, should be about $\frac{3}{4}$ of an inch diameter and $\frac{1}{10}$ of an inch broad. For other work they are made large and broad, with indented patterns engraved on the edge. The small wheel is used for indented work, which I will here explain. You can understand that while it is easy to *stamp* or *press* a line on wet leather, it would be difficult to *draw* lines on it with a point on account of the fibre, which would "catch" and pull. Now a wheel acts by pressure, and it is therefore suitable to mark lines and draw patterns. There is a so-called "pattern wheel" (sold by shoemakers'

furnishers) with points like the rowel of a spur. It is suitable for marking out *appliqué* patterns drawn on paper and *through* the paper, and into leather. They cost about 10*d*. Any smith or tinker can take the rowel out and put in its place a dull-edged wheel.

The old *cuir bouilli* work, whether Spanish, Italian, or Oriental, which now sells for extravagant prices, was easy to make, and of very cheap material. As regards elegance, durability, toughness, and hardness combined, it surpasses wood, gutta percha, or any other material. I believe that anybody with a taste for patterns can learn from these instructions how to make for a few shillings objects equal to those now seldom seen out of museums, which sell for as many pounds. Now let it be remembered that as regards flat stamped work there are two great divisions, firstly, that in which all the patterns are worked by hand, singly or *drawn*, so to speak; and secondly, the more mechanical kind, in which engraved panels, cylinders, or dies are employed to stamp or print the surface. The first method is by far the most artistic, the second most rapid and profitable. There is a character and expression in work done by hand which renders it far more attractive to refined taste than any machinery work, but, on the other hand, an album-cover pattern which would take you a whole day to tool and indent, can be stamped in a minute from a panel cut in intaglio.

For an experiment in indented work take the following, which is copied from a Florentine *calmaio*, or ink-and-pen case of the fourteenth century. The

only tools which you will require to make it will be a tenpenny smooth-edged pattern wheel, three or four wooden gouges suitable to the curves of the leaves—which you ought to be able to make for your-

Fig. 9.

self in ten minutes, and a wooden or bone dull bodkin to indent the background.

Take the leather; good stout basil is best; and having marked your pattern, wheel the principal lines.

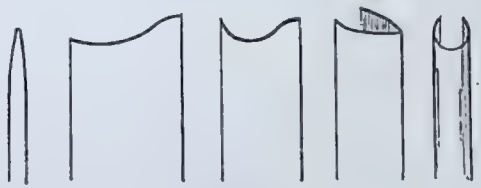

Fig. 10.

Then with sticks with flat ends, of which you must prepare several of different shapes for the corners in the design, press down the background, which will elevate the pattern. By working from the other side, this *repoussé* may be raised to half an inch. Then

with the wooden gouges or punches shape the leaf-like ornaments, and finish by dotting the background with a bodkin. Or you may finish it with a cross-hatched stamp. Having done this, you may proceed

FIG. 11.

to work a sheet of leather in pattern, which may serve, according to its size, for an album or book-cover, a panel for a cabinet or door, or a chair-back. The same sheet, if rolled, while damp, around a

cylinder, such as a flour-pin, and joined at the edges by careful stitching and covering the stitches, may be converted into an ornamental tankard, a box or

FIG. 12.

music case. (*Vide* Fig. 12.) To make these book-covers, &c., begin by preparing a core of paper and strong paste, or of boiled leather, or of leather in the finest pieces, or scraped and rasped to powder and

mingled with paper and dextrine paste or patent knotting. Harden it well under a wooden roller. Now, having a pattern drawn on paper, lay it on the leather and either mark it through the paper with a dull bodkin or a pattern-wheel without points. Remove the paper and depress the

FIG. 13.

background with a cross-hatched stamp, and finish the design with your wheel, gouges, and punches. If you wish to work rapidly, you may make or have made some cylinders of hard wood or brass of different widths resembling garden rollers, very strongly

mounted on handles. You can understand that if a pattern be cut on the outside of a cylinder, you can by pressing and rolling run it on soft leather to any

FIG. 14.

length. Such cylinders are useful for making borders and for varying them in designs. Of course if you have a cylinder four inches in diameter and a foot in

length, you can with it stamp or roll a pattern twelve inches by twelve as rapidly as the damp sheets of leather could be handed to you. A common roller, like a flour-pin, of hard wood suitable for such work, with a pretty and simple pattern, should be made from ten to twenty shillings.

The easiest and most profitable way of working leather is to take a panel of any size in hard wood of any kind, and draw and cut a pattern on it in sunk-carving. By all means learn to do this yourself. The intaglio is cut out with gouges, proofs being taken with putty as you proceed. If the work is rough, smooth it out with sand-paper. When finished, lay your wet leather on it and squeeze it down with a leather-covered roller, or under a press or by hand with a sponge. When a sheet of leather is used, coat the back with patent knotting and it will become perfectly hard. Remember that any kind of a stamp may be useful in leather-work, and if you can make moulds of plaster of Paris, hardened with alum and gum arabic, of any objects in relief, dried thoroughly and oiled, they will serve for many impressions with very soft leather.

A curious and beautiful ornamentation, suitable for boxes, cylinders or panels, may be made by taking sheet-brass or sheet-iron or zinc and cutting out patterns from it with a fret-saw. Press this on a sheet of damp leather, and sink it so that the soft leather will rise in relief and project through the holes in the metal. Sheets of different metals thus cut in many patterns are sold at certain shops.

The small articles of old *cuir bouilli* were generally

thoroughly blackened. This can be done with wood-stain or ink. For coarse work which is to be blackened, scrap-leather if squeezed under a press is good enough. Treated with bi-chromate of potash in the glue they will be waterproof. Old English or Arabic sentences made in high relief, in this manner, blackened and finished with a few touches of gold are elegant ornaments and cost next to nothing.

Fig. 15.

Summary.—Remember that any pattern whatever may be put on leather, either by simply painting it or by dyeing it in with ink or wood stains, or by silvering and gilding, or by using saddler's varnish. Secondly, it may be cut out in cardboard of any thickness, and stitched and glued on the core and covered with a thin sheet of boiled leather. Thirdly, it may be drawn on a sheet of paper, and pricked or rubbed through with a pattern-wheel, or drawn at once on a box or cup, covered with wet leather and then worked in with a tooling-wheel, wooden gouges, bodkins, and stamps, as was commonly practised in the elegant objects of ancient *cuir bouilli*. Fourthly, leather may be ornamented with cylindrical dies set as rollers, or with any stamps or intaglios. Fifthly, it may be moulded like clay or papier mâché or wax, and squeezed or pressed into any form by hand, either in moulds or on objects such as plates, cups, or bowls.

Sixthly, it may be embossed on a flat mould such as a panel with sunk or intaglio cutting, and printed off with a press, or a hand roller or sponge. Seventhly, it may be cut out from coloured leather and glued on a leather ground, the edges being tooled with a wheel. Eighthly, it may be cut in sheet metal, the moist leather rising in alto-relievo through the interstices.

The student should bear in mind that leather work is an art by itself, and should never be regarded as imitating wood or anything else, an idea which never entered the heads of the old artists in *cuir bouilli*. It is, for those who understand it, as purely an art of modelling as though it were clay, and it ranks as high as any other decorative art. Those who practise it should endeavour constantly to treat *cuir bouilli* as a really plastic material, and to obtain such skill in manipulating it as to be able to model and mould it like wax. It is the same with papier mâché, or pulps, or any materials used for the cores. With a little practice they can all be moulded or "run up" with ease. Parchment or vellum, softened and properly stamped, resembles ivory.

Objects to be Made.—Long cylindrical boxes, varying in shape to a truncated cone, were commonly made in Italy of *cuir bouilli*, for the purpose of containing family documents. These can be made of a single piece of stout leather soaked, rolled on a wooden pin, stitched, and then covered with thin leather, or of a core of papier mâché made on the pin. They are either ornamented by hand with wheel and punches, or printed from blocks. If the relief be tolerably high, it should be filled up in the

back with sawdust and glue, cement, or with plaster of Paris mixed with alum and gum arabic. If made for sale, it will be found economical to buy the boxes ready-made, or have them made of *extremely* thick cardboard. To make them yourself, fit a piece of strong, but not very thick, cardboard around a cylinder of wood, glass, or metal, so that it will project above the rest of the core and wrapper.

FIG. 16.

A is made on a smaller cylinder, while B, the lid or cover, must be made on another of exactly the same diameter as that of A. The top is made of a round piece glued on. Somewhat varied, these cylinders are suitable for *bonbonnières*, or sugar-plum boxes, stationery, music, spills, and knitting or crotchet needles.

Bowls and Cups.—A common wooden bowl, eight inches in diameter, may be got at any cooper's or furnishing shop. Smooth down the outside with a rasp and sand-paper. On this side you may make a core of papier mâché, and ornament it as before described. Or you may have sunk or intaglio patterns cut into the exterior or inside of the bowl and press your soft leather into it. Properly made, these leather bowls are very elegant, and resemble the mazer bowls which were so common in the Middle Ages, but have the advantage that they will not crack from a fall. Bowls, plates, or cups may always

be raised on supports or bases, which may be cheaply made in wood, or covered with leather (*vide* cut 6).

Plates form elegant ornaments for hanging up, especially if ornamented with *appliqué*.

Arms.—The hilts of swords, knives, &c., may be made of solid *cuir bouilli*, which should be very

Fig. 17.

much compressed or hammered. Arms should be arranged on a circle (or semicircle over a door) made of board covered with "leather-cloth." A *shield* in the centre may be made of leather and moulded, and ornamented in any way hitherto described. A *quiver* is a graceful ornament, for

which innumerable patterns may be found in works on antiquities and art. It may be made of many patterns and sizes, and hung up with cords and tassels, may be used for many purposes, such as holding canes and parasols.

Fig. 18.

Horns also hung with cord and tassels are graceful and useful. One very good shape is that of the Scotch powder-horn flattened on both sides. If made on a wooden mould, it must be cut in two pieces to get it off. A shot-flask, handsomely ornamented with cords, &c., is a pretty fancy for a *bonbonnière*,

and if solidly made from *cuir bouilli* may be adapted to practical use. A flask of glass may be thus covered. Helmets were anciently made of boiled

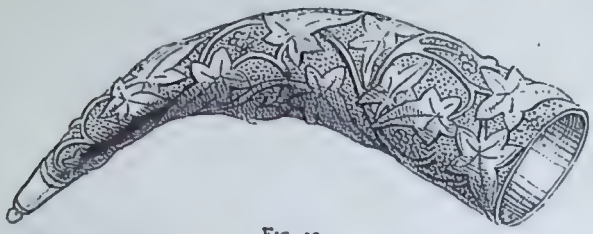

Fig. 19.

leather. Very elegant helmets, or morions, to hang up in a library, may be easily formed from leather waste or papier mâché. A bowl may serve as a block

Fig. 20.

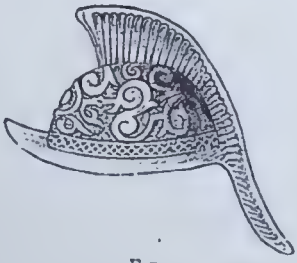

Fig. 21.

for the crown, but you can often hire an old helmet from a curiosity-shop for a mould.

Boxes may be made in the form of fishes, either on

a rudely-shaped block of wood, or like a thin concave dish of Japanese pattern. Work the scales with a

FIG. 22.

wooden gouge and touch up with gold or bronze powder and gum. Then varnish. Beetles, flies,

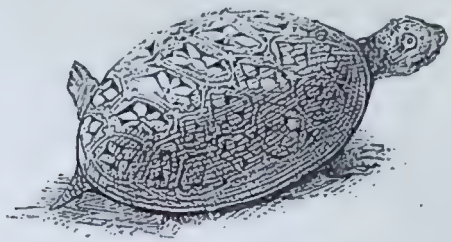

FIG. 23.

frogs, tortoises, ducks, owls, monkeys, and cats, may all be shaped on moulds or moulded by hand, and

FIG. 24.

FIG. 25.

FIG. 26.

made into boxes. Of course in all these boxes the upper part, which serves as lid, must have a rim or

tenon worked up or glued on inside, to keep it on. All of these grotesque objects may also be made in dish form, that is to say, you may make a core on a convex plate, as already described (page 5), and then cut from it, when dried, a fish, frog, duck, or anything you please. With handles these make excellent baskets.

A droll toy, which would meet with ready sale at river-sides, and by ponds in public parks, can be made by taking a decoy-duck of wood and spreading over it a coat of papier mâché. When dry split the

FIG. 27.

paper duck thus formed, remove and reunite the halves, put within at the bottom an oval boat-shaped piece of wood, glue it down, and paint and varnish the whole. A duck thus made will float for several days. Toy boats can be made in the same manner with papier mâché or leather waste, and if the glue with which the sheets are mingled be mixed with bichromate of potash they will be waterproof.

Bonbonnières, or boxes for sweets, are in greater demand every year, and are elegantly made from leather either stamped, stained, or in *appliqué*. They may be made in a great variety of shapes, such as cylinders, cones, horns with lids, vases, barrels, cocoa-nuts, fruits, shells, animals, books and caskets, shrines,

houses, hats, boots and shoes, tankards, books, covered baskets, small portmanteaus, or quivers. Always make them strong as well as elegant. It seems to be a principle with the makers of French *bonbonnières* that they shall always be useless except to convey a single gift of sweets, but the custom of

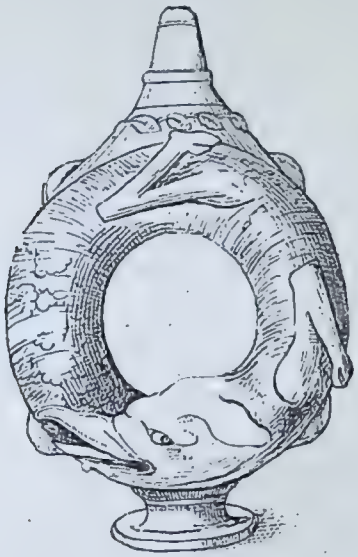

FIG. 28.

using strong Japanese boxes for this purpose is a move in a better direction.

Baskets.—Any ordinary basket of a graceful shape can be coated with skiver, which should be glued on and pressed firmly into the interstices with a dry sponge. Bowls, either round, oblong, or oval, flat, or of any shell shape, fitted with handles and adorned

with leather flowers, or *appliqué* work (termed by bookbinders *mosaic*) are very pretty and saleable. Shell baskets may be moulded on real shells. Any plate, saucer, boat, or box with a handle becomes, of course, a basket.

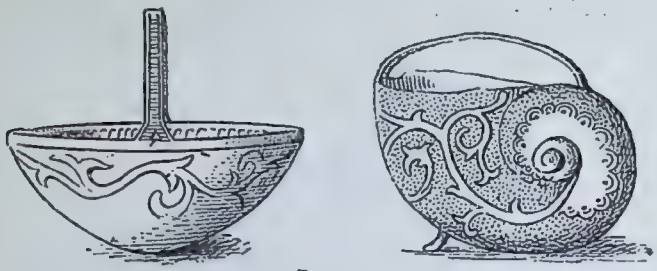

FIG. 29.

Hampers or letter-boxes to hang up and contain the daily newspapers and letters are elegant and useful. They may be made of thin wood for a shilling, or of papier mâché, and covered with skiver.

FIG. 30

Panels.—Thick sheets of stamped leather partly gilded, or thin sheets on papier mâché mouldings are admirably adapted for panels of different sizes, which

may be set in doors, cabinets, boxes, caskets, shrines, the backs of chairs, the sides of chests, or on walls. The stamped and hand-worked, printed *appliqué*, or stained leather should be tacked carefully on a thin deal board or frame, as canvas is stretched by artists. Panels look best when framed in wood. They are the best of all leather work, and are easily made. If you

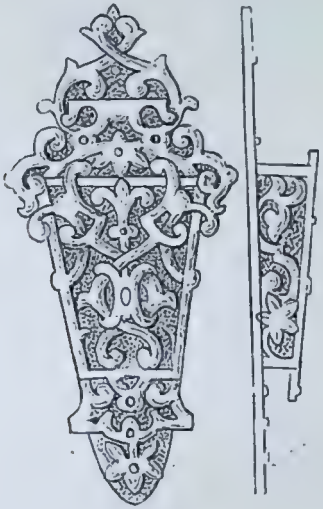

FIG. 31.

have a hard wood intaglio mould, thirteen inches by six, costing from ten shillings to a pound, to print or stamp with the leather panels stretched on a thin deal board will not cost over a shilling each if made of skiver, nor more than two if of basil. With a metal mould and a press they can be made from waste for a penny each. If you can get or make several dies, moulds, and rules, to be "locked up" in a frame of

wood or metal, you may vary your patterns. Or if you choose, print the border, and work up the centre by hand, giving a few hand touches to the printed portion.

Tankards.—Made from solid thick boiled leather, they may be used to hold liquids. They should be closely stitched, the seams to be covered with tooled strips. Glass or metal tankards for flowers may be elegantly covered with embossed leather. For papier mâché or waste tankards, obtain a wooden block of the shape shown in No. 1.

FIG. 32.

The handle is made of leather waste, boiled and rolled into shape, dried and stitched and glued on. A wooden base, such as has been described (Fig. 9), may be added, and the whole ornamented to form the tankard No. 2. The block may also be reversed to form the shape given in No. 4. Any of your stamped sheets may be made into cylindrical tankards with a paste-roller. Add if you like a handle and a base. Common tankards, ancient or modern, or the blue German and Flemish ones now so common, make excellent moulds.

Cigar Caskets may be made like the house-shaped shrines of the middle ages or the round cottage, conical-roofed terra-cotta coffins of the early Italian races. In the shrine, one half the roof lifts as a lid, in the

FIG. 33.

round caskets the whole is lifted off. Finish the interior with a piece of exactly-fitting cigar-box wood, perforated with holes to contain the cigars, and stained black or covered with leather. These caskets may be used for any other objects as well as cigars. They may be made of common square box form and of perforated metal with leather relievo.

Brackets.—Form a very strong core of solid wood

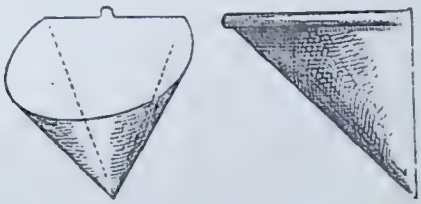

FIG. 34.

or thick papier mâché board in the shape of a cone wanting one side by a third or a half (Fig. 34). This

should have a piece of thin deal board exactly fitted and nailed to the inside of the mouth (Fig. 2). Another board of the same shape, but half an inch

FIG. 35.

larger as to the round, with a bevelled or rounded edge, should be fastened on the other. This is the shelf. Now make a dragon or any animal (flat) out of

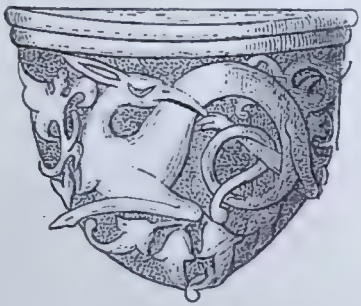

FIG. 36.

papier mâché or waste board, three-quarters of an inch in thickness, cover it with skiver and finish with wheels

and punches. While damp, curve it so as to sweep round the cone. A few ivy or oak-leaves may now be cut from sheet leather, stamped and outlined with wheel and bodkin, dried and wreathed about the figure. If you have sufficient skill model your image of the beast from *cuir bouilli*, papier maché, or wood "in the round." An owl is easy to mould with out-

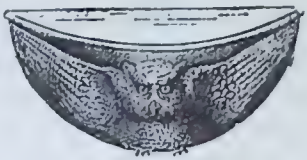

FIG. 37.

stretched wings for a bracket, either round or flat. Another kind of bracket is made by forming a core on a china bowl. Cut it in halves, and taking one of these, cut out a round piece of *very* thick card-board, the size of the rim of the original bowl. Bend it in halves at right angles to form the back and top. It will then present the appearance of a quarter of an

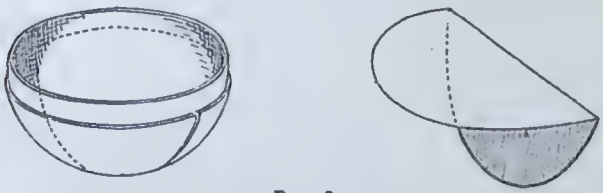

FIG. 38.

orange. Fit a board shelf to this and ornament with scroll figure and leaves. Or take a wooden shelf of any pattern, support it with a gnarled and twisted branch or bough, and introduce the figure of a cat or

dragon winding among the boughs. If you cannot make these figures in the round you may find at the china stores figures which can be used as moulds.

As an *art*, leather work is limited to ornamenting by hand alone, and to producing designs with the wheel, the marker, bodkin, punch, and stamp.

SEWN LEATHER WORK.

Sewn leather work is very effective, and the materials required for it are very cheap. Those who have seen the many-coloured boots from Kasan, so well described by G. A. Sala in his *Journey Due North*, or the saddles, pouches, and slippers made of it, know that it approaches illumination. The materials are simply basil and book-binders' waste scraps, while the art consists of cutting out patterns, *e.g.*, leaves, flowers, or animals, from highly coloured bits and sewing them on basil as a ground, or to each other as in patchwork. The simplest object of sewed leather is a tobacco pouch, to be hung with a pipe. Take a strip of basil six inches wide and eighteen in length. Fold up one end

FIG. 39.

six inches, sew up the sides, and then bend the flap over it in front so as to cover the pouch. Then having cut out, let us say, a rabbit in scarlet leather

surrounded by a wreath of ivy leaves in green, sew them neatly on the flap. Books, albums, boxes, or any other objects may be covered with sewn leather instead of that which has been soaked, or pressed, or stained, &c. Of slippers, bags, gloves, and objects which are commonly made with leather, I do not propose to write.

SHEET LEATHER WORK.

By sheet leather work I mean chiefly the easy art of imitating flowers, leaves, and fruit, by simply cutting out the petals or foliage from sheets of skiver or basil, moistening them with alum or salt water, marking them while damp with a bodkin, drying them after bending into shape, and then mounting them on very flexible wire stems wrapped about, with thin leather. If the stems are quite small, or, if it be desirable to imitate vine tendrils, narrow strips of leather, damped and rolled, are sufficient. The indentations or projections of oak or ivy leaves are made on a spoon, bowl, balls, or by pressing with the fingers. Grapes are imitated by inclosing marbles in tight leather bags and tying them in a bunch. To imitate flowers, such as roses, the leaves are not made separately, but are cut in circular rows, which are fitted one on the other. But flowers, however accurately imitated in leather, seldom produce a good effect, while leaves, on the contrary, well made of thick leather well hardened, sometimes form very elegant ornaments for frames and brackets. When the leaves or flowers are dry

they should be coated once or twice with thin parchment size to be applied with the brush. If desirable, varnish of different kinds may be used. The best instruction for making sheet leather work is the careful study of flowers and foliage themselves. Where great rapidity is desirable, leaves such as ivy and oak may be marked out by a pattern leaf made of cardboard or tin.

CHAPTER II.

PORCELAIN OR VITREOUS PAINTING.

THE student of even the "small arts" cannot impress it too strongly on his memory that the least of these should have its special province, and avoid entering on that of others. Keep every art by itself. Giulio Clovio was a great artist who painted fine heads in vellum books, but his work was not "illumination." Etching on copper should not ape steel engraving, nor engraving on wood be made to imitate that on metal of any kind. It is no excellence in leather-work when it looks like wood-carving, nor should pictures of a character appropriate to miniature, water-colour, or oil-painting, be introduced on cups and dinner-plates. A plate or plaque may, if you will, be hung up as a specimen of decorative

art, but it should not, as a dish, be deliberately turned into an object fit for nothing else but to be hung up and made the medium of a portrait, flower-piece, or landscape. Of course everybody has a right to paint what he pleases on anything. But if I am asked why he should not, I reply that it is a great and good thing for the sake of culture to develop art honestly and clearly. This is not short of a moral duty that every art, however humble, should be kept within its own lines and be independently developed, for thus only can it be perfected. It was by adhering to such rules that etching, leather-work, and painting on porcelain and faïence became characteristic and excellent. But even if the beginner does not care twopence for the development of arts on correct principles, and would be perfectly satisfied to make anything which would be admired, or sell well, it would still be to his advantage if, in painting on tiles or plates, he would for a long time apply himself to those decorative designs to which all such painting should be legitimately confined. There is no reason why flowers or faces should not be painted on pottery, but it is out of the limits of taste that they should be so elaborate as not to be in keeping with the idea of *utility*. It is certain that while picture-making has attained what seems to us to be possibly its highest development, pottery painting is as yet manifestly in a low state as an independent art, as is proved by the great efforts constantly made to give it character; and the reason of its want of character lies in the tendency of artists and amateurs to make it an imitative art. In oil- and water-colours the chief

merit consists of freedom or personal character, and this is very much restrained by the great care and risk involved in ceramic art. But this care and risk detract but little from merely decorative designs.

Painting on porcelain or pottery of any description is essentially the same as painting on glass or enamelling on any incombustible surface; that is to say, mineral colours are used which, when subjected to an intense heat, melt or fuse, and adhere to the ground substance. As that material which gives the colour does not always fuse easily, or combine with the ware painted on so as to adhere, it is generally mingled with a flux, that is, a substance which acts on *both*, causing the metallic colours to melt, and combining them into one. Thus it is hard to melt iron ore until lime is introduced to it. The flux in porcelain painting is *vitreous* or glassy in its nature, not only *fixing* the colours, but also glazing them. It consists accordingly of the same materials as glass, that is, sand, borax, and lead.

As I only propose to set forth the rudiments of porcelain painting, and as these do not involve to any very great extent the mixing of colours, it is hardly worth while to discuss the chemistry of the pigments. Yet there are a few rules well worth acquiring, which the reader will find, with much more useful instruction, in Lacroix's *Des Couleurs Vitrifiables*.

They are to this effect. Certain colours may be mixed together as in oil- or water-colour painting, while others may not. The colours contained in any one of the three following groups may, with little exception, be blended; that is to say, any colour with

any in its own group, but not with the others. Iron, being the principal source of colour, is taken as the base.

Colours containing no Iron.—White owes its colouring matter to tin or phosphate of lime; blue mostly to cobalt; lilac, dark violet, carmine, red-lake, mauve, crimson, ruby, rose, and purple-carmine to purple of Cassius, which is made from gold and tin. Silver is added for carmine.

Colours containing little Iron.—Yellow owes its colouring matter to antimony, green to chromium.

Colours whose Base is Iron.—Reds, iron violets, brown reds, and flesh tints. *Browns:* yellow browns, ochres, black, and a large proportion of greys.[1]

There are two kinds of porcelain painting, each requiring a different set or sort of colours—the over-glaze, in which you paint upon ordinary glazed ware—for example, any plain white China or stone ware plate; and secondly, the under-glaze, or biscuit painting. In this latter process there is no flux in the colours, which are applied upon an unglazed surface, the glaze being subsequently laid on and baked, generally for amateurs at the factory. Over-glaze is suitable for beginners, and in its simple forms not much more difficult than water-colour painting, that is to say, so long as the artist adheres to single colours or to simple and certain blending. Any-

[1] Not having Lacroix's work at hand, I am indebted to the work *Pottery Painting for Amateurs* (London: E. Matthews and Son) for the translation. I am also under obligation to the *Peinture sur Porcelaine* of Casimir Lefevbre (Paris, 1874); but above all to Miss Madeline A. Wallace Dunlop and to Miss Lily Doering, both artists in porcelain painting, who have exhibited at Messrs. Howell and James's. This firm has done everything in its power to conscientiously advance amateur pottery painting in England.

body who can paint a little in water-colours, or draw with a pen, can also work on tiles.

It should be remembered that while *reds* intermix, they do not combine very well with other colours. Many colours after firing become stronger or deeper, the reds doing so to a slight degree, but *carmines*, *purples*, and *pinks*—which must all be used very cautiously, being apt to spoil unless carefully applied—"intensify" very much. These latter colours should not, as a rule, be mixed with any others, and they should always be managed with a horn or ivory spatula, or palette knife. *Yellows* are all very strong colours with a tendency to kill or absorb other colours, particularly the reds. *Greens* all grow stronger by being fired. They can be mixed with yellows, blues, and browns, care being taken as to effects with the latter, but they kill the reds. *Black* and the *browns* are steady in their action, undergoing little change except that the blacks become stronger when vitrified. *Blues* combine with most colours. Black mixes with all except the pinkish or purples.

As in etching on copper, if the plate be imperfect after a first biting-in, or if it needs stopping, there must be a renewal of the first process. So a tile which has been painted and fired may require retouching, or there may be a portion which you would like to obliterate or renew altogether. In this case we lay on a rather heavy coat of white, and when it is dry, colour it with any tint, or else fire it and then paint over it. Though Chinese white will mix with all other colours, white is a difficult colour for the beginner to blend with them.

MATERIALS.

Colours.—There are several kinds of colours in use, such as those from Dresden, which are used at Meissen; those of Lacroix, or French colours; those of the Messrs. Hancock, which are quite as good as any; and the Staffordshire colours of F. Emery and Sons. Lacroix's paints may be had all ready for use in tubes, and when fresh they are excellent, but they do not keep long in this form without running to oil, and are expensive. All may be had in powder in small tubes of most sellers of artists' materials. In this state they must be ground up on a glass slab with a small ground-glass or marble rubber called a muller, mixing them with sugar or oil at first, then adding sufficient water or turpentine to render the colours fit for use.

Colours are now made of so many shades, and in such a great variety, as to enable the artist to avoid a great deal of mixing. Lacroix's ordinary list of over-glaze colours alone embraces sixty-two. Many of the most striking and beautiful old Italian and Oriental plates were painted by artists who had only three or four decently good colours, and not half-a-dozen altogether.

Brushes.—These are like those used in water-colour painting of sable, fitch, or camel's hair, of various sorts and sizes. A long finely-pointed brush is requisite for outlining the design. There should be one set of brushes kept for painting on pottery in oil, and another for painting in water. As Mr. John C. L. Sparkes remarks in his excellent *Handbook to*

the Practice of Pottery Painting, "for working in water-colours, brushes made of red or black sable are the best. For working in oil, camel or marten hair will be found most suitable." If the brushes are not firmly attached to their sticks they will sometimes fall off and spoil your painting. Brushes after use should be washed out carefully in turpentine, and if they are then again washed in spirits of wine, and then again in soap and water, they will be all the better for use and last longer. Turpentine is quite insufficient for large brushes. An indispensable brush is the dabbler or *putois*, which is made with a broad flat end of soft hair. Of these you should have several of different sizes, from the fourth of an inch or less, to an inch in diameter. They are used to render broad surfaces of colour even, and to soften and blend margins of shades and colours. For some work of the kind a fine sponge is necessary, as in producing a finely corrugated yet even ground.

A rest is essential in China painting. It is nothing but a strip of wood like a flat ruler, eighteen inches long, more or less, and from an inch and a half wide to three or six inches, as you may need or prefer.

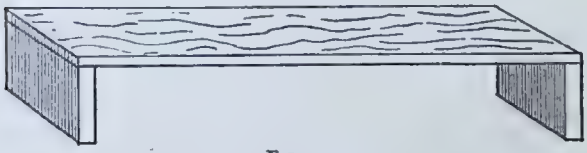

FIG. 40.

Having this strip, take two bits of the same wood, each an inch in length, and nail or dovetail, and glue

them to the ruler. This is used to put across the tile or plate while painting, so that you may work on one part without touching or injuring the remainder.

The Palette.—At the shops where you buy your colours you can also obtain china slabs with cup-like holes in them which answer very well to contain the colour used while at work, but two dozen small water-colour saucers, costing one penny each, are much better. The pupil should then get a smooth bit of board an inch thick, and have two dozen cup-like holes drilled in it, into each of which a saucer should fit exactly. Do not fasten them in in any way, but leave them loose, so that each cup may be taken out and washed separately.

Mediums for mixing.—These consist of oils of two or three kinds, only one of which—fat oil of turpentine—is indispensable for beginners. Fat oil is easily made by keeping a pint of turpentine in an open bowl on a moderate oven for two or three days, till nothing is left but a spoonful of clear oil, which must be kept in a well-shut bottle. Oil of lavender, or of cloves, is very useful at times to give an easy consistency to the colour, or prevent its drying too rapidly. Spirits of wine is essential for rapidly cleaning the brushes, palette, and china. With these you will require one palette knife of steel, to be used with great caution, and one of horn, a few carbon pencils at a penny each for drawing on porcelain, some transfer paper and a finely pointed penknife, and a duller ivory or wooden bodkin for the same; also one or two sponges, which are invaluable for many effects. In hurried work you can imitate foliage by applying different shades, as

the first dry, very accurately with a sponge, touching these up afterwards with a brush. You can also produce with a sponge, backgrounds which could be made in no other way. With these, plenty of soft old rags. This constitutes a fair outfit. Boxes are sold from one to four pounds, containing every requisite. But the artistic amateur may very well begin with a sixpenny tube of blue or brown, a sixpenny tile, a penny brush, and a penn'orth of turpentine. If he can *paint* at all, he may sell that tile for a profit on his entire investment, and thus progress towards the possession of all the materials needed. Good work has been turned out by many a painter with as simple material. The Kabyle women paint pottery cleverly by making their own brushes with pieces of fur tied to sticks, drawing the outlines with other pointed sticks which they dip into the colour.

As for plates, you will find that the commonest faïence, or earthenware glazed, costing as dinner-plates twopence, are the best for beginners. Such plates of a *little* better quality, simply because they are made into a shape to paint on, and which cost no more to make, sell for a shilling at the artist's material shops. The very coarseness and toughness of these common plates render them easy to fire, though they are not adapted to be baked more than once or twice. They have very often a coarse bluish or yellowish tone which assimilates them to old ware. If you will order three or four dozen at a time, and supply the ordinary shallow porcelain plate for a pattern, which is usually preferred for painting, most dealers in crockery will have them

made for you for three shillings a dozen. Besides plates of all sizes of china and faience, are tiles of different dimensions and shapes, jars, vases, pilgrim-bottles and ornaments in great variety, such as are sold by Messrs. Howell and James, Matthews, Barbe and Lechertier, Minton, and many others.

You may begin by sketching your subject very lightly on the tile with a carbon crayon, or by drawing it by laying transfer paper on the surface, and marking through it with a tracing point of metal or ivory. If you use tracing paper it will smear at first, but it becomes much cleaner with use, and an old piece which has been carefully used is invaluable. But it is much better to sketch your subject, if you can do so, in light red or clear grey paint with a fine brush. Keep a tile by you for a test-palette. If you find, as many do, great difficulty in sketching with a brush, use a fine pen with colour very thoroughly mixed with a large proportion of turpentine and a drop of lavender or cloves. This should be put in a small bottle, and very often shaken while using. Or you may prick your pattern with a large pin or pattern-wheel in a sheet of varnished drawing-paper or of Whatman's bank-post paper, which is at once thin and very tough. Lay this perforated paper on the tile, and "dab" the surface over with a loose bag filled with charcoal, or mark it by passing the point of a fine brush or pen through each hole. The dots thus made should be at once connected by an outline brush and India-ink. Some artists sketch or paint their pictures on china in water-colours, and then paint them over with the enamel. There is, however, another

kind of water-colour used on porcelain or pottery. The reader can understand that to make the colours spread freely, whether they are in powder or come as paste from the tube, they must be mixed with a liquid substance. For pottery of any kind there is a threefold method. Firstly, with a combination of sugar or gum, or both, which is called the *vehicle.* With these is mixed water, which is the *medium.* Secondly, by the use of fat oil of turpentine or oil of lavender as the vehicle, and turpentine or spirits of lavender as the medium. Thirdly, glycerine.

The beginner would do well to confine himself for some time to turpentine and oil with a judicious use of lavender, as being easier to manage, though the first method has the advantage of not offending the sense of smell, as do the other materials with many. As the preparation of the colours is of the greatest importance in china-painting, a more detailed description may be necessary for the beginner. The ordinary china colours, as for instance those of the Messrs. Hancock of Worcester, are prepared in painting as follows:—Put a little of the powder, according to what is required, on your palette—a six-inch tile is most convenient—then add just enough of fat oil of turpentine to allow freely mixing the colour. This must be done *thoroughly* with a muller or palette-knife, until it is a perfectly smooth paste, taking great care that there is not too much oil. Then add sufficient turpentine to allow of painting freely, and if with all your care it seems faulty, add a drop of lavender. When the paste looks polished if stroked one way with the palette-knife or spatula,

and rough when stroked the other way, you may conclude there is enough oil in it. Yet to lay on a thin or even wash of colour, more oil may be used without risk. If, on the other hand, there is too little oil or turpentine, the colours will work roughly, and are liable to spoil in the firing. Even if an excess of oil has been used, as will appear by a shiny, glossy or glazed appearance when dry, the plate may still fire pretty well if kept for a very long time before going to the kiln. Great care should be taken, especially in over-glaze painting, not to lay at once very thick masses of colour in one coat. If you do this, there will result a rough crumbly substance which rubs away at a touch, leaving a dry, rusty appearance. A very safe way to get in dark or dense shading of one mass, is to lightly *cross-hatch* your lines as in water-colour painting. If you let them dry well before crossing them again, and so on, you can get more paint on to fire well than if it were laid on in a body, and the same holds good in applying it with a dabbler or sponge. And I would here say that the pupil would do well to make as many experiments as possible on tiles with the sponge and brush, the dabbler and stiff flat bristle brush, as well as in graining with combs to produce grounds. Curious effects may also be produced by simply pouring masses of liquid colour over plates and letting them dry. The beginner will for a long time have some trouble in getting the paint and its vehicle and medium to flow freely without being "short," *i.e.* sticking at one time and running at another. Begin with a tile, and let your first effort be something very simple,

as, for instance, a bird all in one colour, red, blue, or brown. Grind your colour up with a drop of fat oil of turpentine, or squeeze it from the tube, and then, using the turpentine as you would water in water-colour painting, outline your bird and proceed to paint, avoiding going over any part which has been once painted, or proceeding with a second coat until it is quite dry. When you paint over this dried portion, do so with a very light touch, or you will cut through the first coating down to the tile. To spread a broad surface evenly is difficult, but it will soon be learned if the student will practise it on a tile, and not follow the almost universal custom of learning everything from making ambitious pictures. One way to spread—for instance, a sky—is to rapidly sweep the colour over a broad space with a large brush, and then while wet, going over it with the dabber, by lifting the brush and very lightly dabbing it down on the paint. Even after the coat seems almost dry an effect can be produced. This extends it into something like a closely-spotted surface, and the fusion of the dots in the furnace will make it quite uniform. Another method is to coat the tile with lavender, or with a thin coat of fat oil of turpentine, and dust the colour in powder through a sieve, care being taken to cover the rest of the picture.

In painting heads, *rouge-brun riche*, one of Lacroix's colours in tubes, is very good to commence with, as it fires well, changing very little. The darker parts should be touched in with *brun foncé*, or dark brown, great care being taken to graduate the colour

properly. "It will be found much easier to paint heads in natural colours after some practice in monochrome." In painting a head in natural colours, begin by making a careful outline in Vandyke-brown mixed with a little purple and black; then lay on a smooth coat of Vandyke-brown mixed with a little light orange all over the face, for the flesh tone. While this is still moist, work flesh red into the cheeks, and wherever else it is required. This can be best done with the dabber. Then take a very fine sable brush and paint in the shadows on the face with a mixture of Van.-brown, purple and black for the deeper tones, using orange and azure for the half tones. The whole face should be worked up very much in the same manner as a highly-finished water-colour. As a head in natural colours will always require two or three firings, the finishing touches may be left until after the first firing, when it will be found that the colours have changed considerably. The flesh red is very liable to burn out. After the second and third firing they change very little.

When, as sometimes happens, the work is spoiled by the colours not having glazed properly, mix a little enamel flux with the colour and use this thinly where required. It combines with any colour but red, and when fired forms a very good glaze.

Glycerine Flux.—Those who dislike the smell of turpentine, or who find fat oil difficult to manage, may grind up powder colours, with equal parts of glycerine and finely-powdered gum, mixing the colour to about the firmness of butter, and painting with glycerine. The disadvantage of this method is

very trifling, as it simply consists in the necessity of drying your painting in an oven before retouching it, as two wet colours will run into and spoil each other. The advantage, which is a very great one, is the slow drying of the paints, which allows a puzzled beginner time for more complicated effects. It is also economical and sparing trouble to paint with glycerine, as the prepared paints, if kept free from dust, may be preserved for many weeks. This may be effected by covering them with a glass or bowl. There are saucers fitting one over the other, sold by Barbe and Lechertier, made for this. Backgrounds may be flattened with a common oil-painting bristle brush held perpendicularly. Very good marbled and mottled effects may thus be gained, and a difference of texture preserved. Glycerine painting before being fired should have a coat of lavender-oil all over it. When the picture is quite dry take a broad flat brush, and beginning at the top, draw broad lines of lavender across the whole painting, always beginning from the same side. The wash of "enamel flux," already described, is spread over a work, especially when several firings are required. It should be made about the thickness of cream, and spread thinly. It gives a soft and pleasant glaze.

Details.—China, or enamel, or vitrifiable paints are not all the same colours after they have been burned as before. The pupil should therefore take a tile and paint on it a row of small squares each representing a colour as it appeared when unbaked, and under it the same as it looks after firing. It is very useful to have in a similar manner on a tile the results of the various

combinations of colours, such as purple brown and black, green and yellow, &c. As some colours when combined disappear almost entirely in the firing, this is almost the only way to record the result. Always write in each square, before it is fired, the names of the colours combined. This is done with the end of an ivory point or penknife.

It is true that in ordinary monochrome painting the artist soon learns to know what every colour will come out when burned. In painting with several colours, lay on the general effects of light and shade together, using the dabber to blend them, and then, after successive dryings, introduce the shadows. Dust and blacks are very injurious to china painting. The room in which you paint should be *very* carefully dusted, and as soon as you cease to paint, put your plate or tile in a drawer, or cover it. Atoms of dust on your plate can be taken up out of the wet paint with the point of a needle; sometimes two needles lift it better. If left, the paint draws and settles round the fleck, making a dark spot, which would be very ugly in a face. A piece of wash-leather tied tightly round the point of a thin brush-handle, and *slightly* touched with turpentine, is very useful in removing spots. If too wet the turpentine will spread and spoil your work; if nearly dry it lifts the spot, or makes a clean removal of the paint, exposing the surface. After painting, the Dresden artists keep their work for a day in a common oven, at a very moderate heat, to dry the colours. It is not usual in England. Always, before painting, wash your china very clean with soap and water and a soft towel, or the colours will

shrink from it. The student cannot fail to find out for himself when and where to use gum or sugar and water, turpentine and oil, or glycerine. He will, in the end, probably prefer the latter. A few experiments on fourpenny tiles will teach more than any book. There would be twice as many successful artists in this style if beginners would thus experiment *and learn how to paint* instead of attempting to make pictures from the beginning. Do not forget, if your tint dries too harshly, or works too stiffly, or needs softening, you must add a little lavender, aniseed, or oil of cloves, to make it blend properly. It tempers the harshness of the turpentine and improves the working of the fat.

Drawing on tiles with a pen is not perhaps strictly within the provision of decorative art, as it should be applied to ceramic ware, but there are cases where an autograph or a free-hand sketch with a pen, by a friend, may acquire additional value from its being in such a form. All that is necessary is to have the tile extremely clean and to use clean new pens. Take the colour, grind it with extra care, and mix it with turpentine in a bottle; while using it, shake it up thoroughly and often. If harsh, add a few drops of lavender, clove, or aniseed.[1]

[1] The writer was, as he believes, the first to exhibit, at Messrs. Howell and James's, pen-drawings on tiles. ("Commended.") Having made very few experiments with the fluid or "ink," he trusts that others who are more experienced will endeavour to improve the process.

UNDER-GLAZE.

To paint under-glaze you must use the so-called biscuit-ware, which, having no glaze, is as dry and absorbent as a brick. Of course the colours sink in it, like rain into sand, or ink into chalk. It is therefore "stopped," that is, covered with a thin coating of gum-tragacanth and water, or of sizing to stop the colour from being taken in too quickly. But whether you paint with or without size there can be very little rubbing out or erasion, "what is once written remains." The designing must therefore be executed with the utmost care. A full fair coat of paint should form the first process, so that there may be a solid ground to work on. This is obtained by putting in the first washes in water-colour, mixing the colour with gum and water instead of fat oil, after the method before described. When all the ground work has been painted in, boldly and freely, paint over it with the colour mixed with oil and turpentine. It all blends together when fired. The great advantage of a water-colour basis consists in there being no danger of *rubbing the colour up* in painting on it. On account of the absorbent nature of the biscuit-ware more oil may be used in mixing the under-glaze powder colours, without risk of their blistering in the kiln.

Very superb effects can be had by combining over and under-glaze painting, which could not be secured by either alone. The splendid large heads which are sent out from such establishments as Minton's owe much of their beauty to this combination. Those who paint on biscuit with confidence prefer the work

to that on the slippery over-glaze. But the burning is no doubt difficult and attended with delay. Each factory has its own especial glaze, the effect of which on your colours must be discovered by sending several test-pieces of common work before sending anything valuable. In the factory of the Marchese Ginori near Florence, it is said that several years' practice are required before the artist and the burner understand each other. A few trials therefore can hardly be thought unreasonable. It is not advisable to wash biscuit-ware, it absorbs too much water. Inequalities can be removed with fine sand-paper, pencil-marks with india-rubber, and the article be effectually cleaned by an ink-eraser. Under-glaze may be painted without turpentine by grinding the colours *well* with strong gum-water and glycerine and painting with water. Avoid sloppiness, and paint always with broad square-tipped brushes, using the long-pointed tracing brush for outlines. The dabbler is but little used in under-glaze. Defective lines may be removed by rubbing with the leather-covered point wetted in water, a finely pointed piece of white wood or a small paper stump. For the shadows of flesh a good grey is formed by mixing light blue and green of equal tones. Paint in broad strokes following the curves of the face, as the colour spreads in firing, leave the strokes rather open. Crossing or overlapping causes darker spots. Fill in with a tint of buff and crimson. The under-glaze reds are poor. The whole face can be painted under-glaze, with the exception of the complexion tint and red of the lips. Back-grounds and draperies can be produced with great

richness of effect and details; browns, yellows and blues, are very deep toned and fine in colour. When the article is fired and glazed, the over-painting is easy, all the shadows being prepared. Purples, pinks, and some light colours, must be left for over-glaze. Geometrical and conventional designs are suited to under-glaze. Tiles and objects meant for use will wear much longer when the colour is under the glaze. The art student may be sure that under-glaze painting is as yet quite undeveloped, and that it will be a greater art when the chemistry of burning shall be better understood. At present much connected with it is entirely unknown, as for instance why colours should burn in an entirely different manner when fired in a new or in an old furnace. The colours peculiar to under-glaze painting change even more than those used for enamel or over-glaze, the manganese browns, reds, and flocks losing tone, the blues and iron browns darkening. If after a first firing there are defects, it is usual to remedy them by painting with over-glaze colours, but as the author of *Pottery Painting* remarks, "this touching-up is always apparent, one colour being under and one over the enamel." When finished, you send your work to the kiln, where it will be glazed for you and fired. When done it has something the effect of a very highly-varnished oil painting. This reason that it looks like something which it is not, renders under-glaze painting a special favourite with those who, like the American, preferred well imitated stone in a building to the real, "because it was more artistic." Yet when boldly treated by true artists, very fine effects are produced as,

there is a great richness of colour and great resources of light and shade. As the author before cited justly says, "The effects when produced are certainly softer than in over-glaze, the colours melting one with the other in a most agreeable manner, and the glaze gives a tone to the whole which is often wanting in other paintings. Conventional subjects are unsurpassingly rendered, and I am inclined to think, judging from what I have seen, that a decorative treatment of all subjects suits the process better."

The defects of under-glaze painting are that pictures in it are more frequently spoiled in firing than enamels, that it is more difficult, and finally that you must often wait for weeks before the piece can be baked. At Messrs. Hughes and Ward's, in Frith Street, Soho Square, over-glaze works are often ready in twenty-four hours, and there are few places where you will be required to wait more than a week for such work. I have observed that there is a great tendency among feeble amateurs who can "almost" make a good picture, to try new methods and new effects, as if art consisted in materials and methods. Now if you can and *will* paint vigorously, a tile and a tube and a brush and a little turpentine will serve as well for a good picture as all that can be got out of all the shops. In every chapter of this book I have endeavoured to teach the lesson that very few and very inexpensive tools or materials are requisite to make a very good beginning in any of the minor arts, nor are many instructions needed to give you a good footing whence you can securely advance confident of success. But these instructions must

be mastered, and practice with the materials made perfect by perseverance.

The student of porcelain painting will soon find out that a very important element of decorative art is the contrast or harmony of colours. The beginner generally assorts the simple elementary colours and greatly inclines to gaudiness, forgetting how low-toned are the beautiful harmonies of many Oriental schools. Damascus pottery scarcely ever contains anything but arrangements in blue, green, and a neutral purple, sometimes only black and green are used. It is however true that very good effects can be produced by matching scarlet, blue, and orange, and relieving them with white or black, or by giving a black arabesque on a yellow ground. The next step will be perhaps to discover that a good picture can be made with a black foundation, out of which ivy-leaves of different sizes come from the different gradations of the darkest up to the very lightest green and white. A single colour thus carried from black to white almost always affords a safe subject Progressing to the free use of greys and of colours which would be described in water colours as thickened with white, the student finds himself in a new world, so beautiful are the effects which these *demi-jour* colours and tones yield when *judiciously* mingled with brilliant hues and white or black. It is an advisable thing to possess well-coloured sheets of paper of all colours, and with them a variety of wreaths and decorative patterns, cut out from paper also of a great variety of colours. By placing one on the other, and varying them, much can be learned. I also

recommend the study of the kaleidoscope. The instrument should be a large one, such as is made for manufacturers, and so constructed that you can easily take out the pieces of glass and insert others. There is a close affinity as regards design between porcelain painting, illumination, wood-carving, and leather-work. The designs used for one may be modified and utilised for the rest, those for illumination leading many, in fact, directly to enamel painting.

There is no art to which the motto of "hasten slowly" is so applicable as China painting, and yet there is none in which we see so much ill-advised rashness and hurrying to make show-pictures. The tyro who can just make a feeble water-colour, attempts on a tile, and very often under-glaze, effects which should naturally require months of practice. That *picture-making* is not the province of porcelain is perfectly proved by nearly all the work of this kind which we see. A beginner, who might do very well with a pattern in single colours, is too often busy the first week with, let us say, a full-length miniature of a mediæval lady, involving mixed colouring and treble firing—the result being failure, or a constant struggle with obstacles, when practice with monochromatic and easy subjects would have given something far more satisfactory with a greater degree of skill and confidence. So many tints are now made, so many shades of colour, that even skilled artists often produce admirable pictures with very little combination.

You can often purchase plates or other articles on which borders are already painted, and these you can

fill in to suit yourself. And old cheap pieces of roughly or slightly decorated ware of different kinds can in like manner be modified, improved and fired to great advantage. It would not be worth while, however, to attempt this with very curious or valuable ware, as the risk of its breaking in the furnace would be too great.

Where it is desirable to ornament a great number of tiles as rapidly as possible and at the least expense, stencilling may be readily resorted to. This is effected by cutting out from cardboard or very thin sheet-brass or copper with a fret saw, a design. The piece being removed, the sheet is laid upon the tile and the paint applied with a broad flat brush and levelled with the *putois*, or the surface may be coated with lavender and the colour dusted on in powder. Of course this may be done in several colours, and it is also possible to lay a ground in this manner, and by touching-up with the brush by hand greatly improve the whole (*vide* chapter on Stencilling). The monochromatic nature of much decorative painting causes stencilling and touching-up to be very much used where there is a great effort at cheapness and show. As it, however, partakes of the nature of merely mechanical art, it is needless to say that except for common decoration in a humble way it is not to be commended for porcelain to the student.

There are different kinds of paints sold for porcelain, rough terra-cotta or crockery, and glass.

CHAPTER III.

DESIGNING AND TRANSFERRING PATTERNS.

I DO not propose to teach the reader unpractised in art how to draw generally, but simply to point out how simple patterns may be transferred or rendered useful in different kinds of work, and also some of the principles of their origin; and how, with a knowledge of these, the pupil may vary and design them for himself. Anybody who can write can draw, yet it is a common thing to hear people protest that they "have no talent for drawing, and cannot design the simplest pattern," as if Nature had taken special pains to create a vacancy in their minds and deprive them of an instinct natural to all children and savages. This plea of wanting talent for any kind of art, seldom means anything but laziness and a want of interest. It is true that many cannot become great artists, but to draw outline patterns for decorative art well enough to carve wood, or mould leather, is possible to all. In Switzerland there are 15,000 families supported by wood-carving

and a few kindred arts, but I doubt very much whether the children of these families are excused from work on the plea that they have no genius for it, or take no interest in it.

The first step to learn to draw consists in getting a tenpenny transparent drawing "slate," or a more expensive one if you prefer it, or a pane of lightly ground glass, or some cheap transparent paper, and placing beneath it straight lines, circles, or curves; practise drawing them till you can hold your pencil with ease. You may either buy transparent paper at the artists' shops, or make it by oiling any very thin writing-paper and then wiping it very dry. A simple and convenient process has been devised by Herr Fuscher for the preparation of a tracing-paper which, after having been used as such, can readily be restored to its original condition as ordinary drawing-paper. If one volume of castor-oil be dissolved in two or three volumes of spirits of wine, the mixture will render paper immersed in it transparent, and, the spirit rapidly evaporating, the paper when withdrawn will become fit for use in a very few minutes. A drawing in pencil, or in Indian ink, can then be made; and if the paper be then placed in spirits of wine the oil is dissolved out, and the paper again presents its original appearance. With the transparent slates sold in toy-shops you can also buy simple line pictures. The outlines of dried leaves, which you may place under the glass or paper, will afford excellent practice. Do not, so to speak, *write* your lines or slash them off rapidly. Many beginners evidently think that the same dash

and speed which is taught by commercial writing-masters belongs to drawing. But *draw* your lines evenly and clearly. Bear on lightly with the pencil, draw firmly, not merely from the fingers alone supported by a never-moving wrist, but with the whole hand and arm. In a few days, if you draw with care, striving to make not pictures to show, but clear even lines, you may begin, as you improve, to copy without tracing. He who can draw short straight lines can connect them into long ones; he who can draw these and curves, can sketch or copy anything.

FIG. 41.

Having mastered lines and curves and a few of the simplest geometrical patterns, the pupil may attempt original design. Let him begin with simple ovals, which he may make from six to twelve inches in length.

Now let him practise modifying one of these ovals into different patterns.

Firstly, let us say, by cutting the lines and bending them inwards. Now supposing this to be a wire—and

a bit of flexible wire will be found very useful in designing—you have only to twist one of the ends into

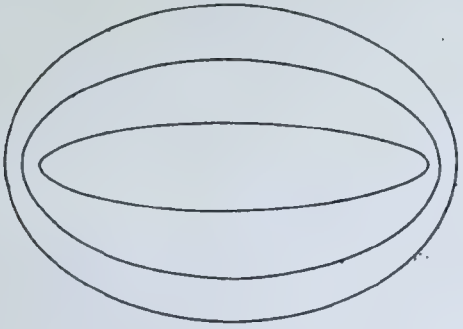

FIG. 42.

any curve you please, draw it, and make the other three exactly like it by tracing, and you will have a symmetrical design for any work.

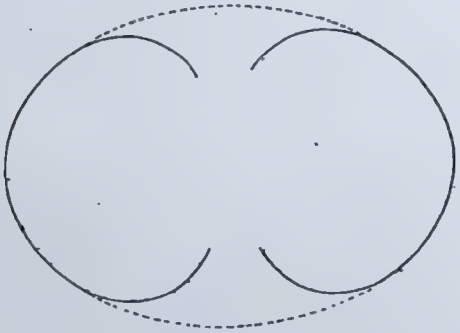

FIG. 43.

Observe, that when your pattern has, or is to have, two sides, or four parts alike, the most rapid method of finishing it is, after drawing one in its place, to

double your paper and trace the two or four parts through on the other side. Remember that any curve or leaf or ornament repeated two or four times, equidistantly, will make a design. Thus one or two ivy-leaves repeated in a wreath, say twenty times, make

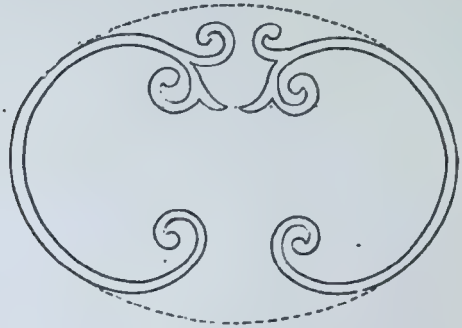

FIG. 44.

a pretty pattern, and nothing is easier than to draw these leaves on a piece of paper, double it twenty times, cut out the wreath with scissors and trace it. Take, for instance, the following:

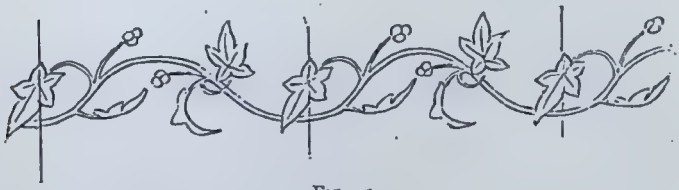

FIG. 45.

Trace and draw this till you have got it by heart, double it with joined stems, make wreaths from it, by drawing a circle and surrounding it with repetitions of the whole pattern or the single leaves. You will do well to provide yourself with two long and narrow

pieces of looking-glass. Paste leather or muslin over their backs, connecting them, and bring it just over their edges, making it like an album-cover or blotter, the

FIG. 46.

reflecting surface being inside. Now by placing leaves or ornamental designs on a table between the glasses you will see a wreath or a perfect ring-pattern, varying with the glass. By means of this kaleidoscope you can design beautiful ornaments. A great proportion of the borders or bands in decorative art are simply based on a serpentine line.

FIG. 47.

Now introduce as you can some ornament on this line after having doubled it into a band.

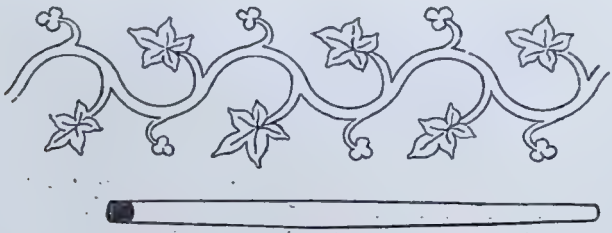

FIG. 48.

Or put leaves on the ends of the branches. Remember that after you shall have learned to draw a

little you should get all the commoner finishing ornaments thoroughly by heart, such as a tendril terminating in a ball, a clover or any other leaf, a spear-point or diamond, an ace of spades, or a heart, &c. Excellent practice for borders may be made by modifying diamonds and other figures conjoined.

FIG. 49.

In designing intertwining lines or bands, every *going over* should be followed by a *going under*. When

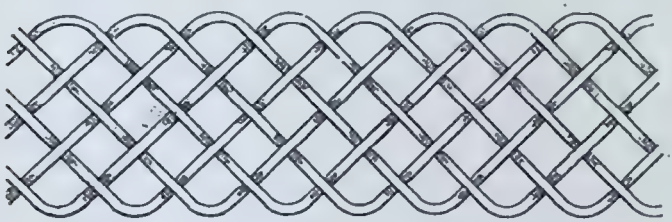

FIG. 50.

the tail or terminal of one tendril or line lies near another, the two should, as a rule, have the same finishing twist, one to one side, the other to the other.

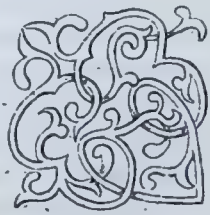

FIG. 51.

Vacant spaces should, when possible, have an ornament tending into or toward them, and this, whether

a thorn, a twig, or a flower, should either have a corresponding ornament, or seem to be endeavouring like a natural bough to get into open air, or else veer toward something in harmony with it. There are certain set formulas of lines which may be easily varied and modified into an endless variety of patterns.

FIG. 52.

These lines are suggestive of the ribs of leaves, and they are in fact taken from Gothic groups of oak-leaves, each line being the centre of a separate one. But as I do not intend to develop the art of design into a book, but to merely teach the simplest rudiments, I will here end by urging the reader to collect, dry, and draw as many leaves as possible, to study design and curves in church ornaments, carpets, or wall-papers, and finally to copy and collect all he can find in books, paying particular attention to the *Art Studies from*

Nature, as applied to Designs, by Messrs. Hulme and others.. (London: Virtue and Co., 1872.)

To simply copy or enlarge a pattern you may either draw lines on it, dividing it into squares, or have a pane of glass or a sheet of transparent paper, thus subdivided, laid upon it. Then it will of course appear to be divided into squares, let us say twelve. Now if you make on your paper twelve other squares four times as large, you will find it easy to copy the small design, because the places where the pattern crosses the line are easily followed on the larger copy.

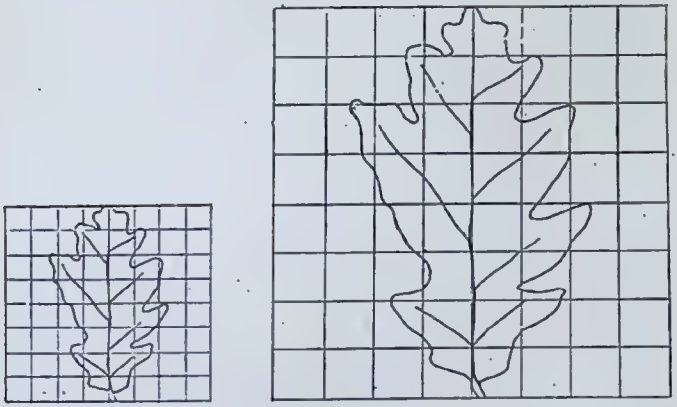

FIG. 53.

A still more effective and easier method of enlarging designs is by means of a pentagraph, with which patterns can also be diminished. Booth, Brothers, 63, Upper Stephen's Street, Dublin, will supply one for 1*s.* 2*d.* by post. At all the artists' shops in London very excellent pentagraphs are sold at different prices. As there are comparatively few artists who can draw so

rapidly and accurately as to rely on the hand, eye and pencil alone, it is necessary to resort to either squares, tracing, or the pentagraphs, to expedite work. Thin boards, cut in every variety of curve, are also sold at artists' shops, to aid in drawing. The designer will find it convenient to have thin sheets of brass in which serpentine lines of different diameters have been cut, through which with a pencil they may be rapidly drawn on paper. A few ovals, rectangles, circles, &c., of thin wood or tin, generally corresponding in size, will also be of great assistance in drawing.

Patterns may be transferred to wood, china, or any soft surface, by first designing them on good writing or very thin good drawing paper, or Whatman's bank-note paper. Varnish this over, and when dry, prick the design through, either with a tracing-wheel or a needle. Then laying it on the surface to be drawn upon, you may either dust fine charcoal through the holes on a white surface, or fine chalk powder on a dark one, or else use a very fine elastic stiff brush, with paint, not too moist, and put the tip in the holes, so as to mark through. There is now made in America a peculiar pen with a point like a sharpened lead pencil, which discharges ink by the pressure of writing and stops the flow when the pressure ceases. This pen is admirably adapted to tracing through stencil points, whether made in varnished paper or thin copper sheets.

Black, blue, red, &c., transfer paper is made by rubbing one side of a sheet of thin paper with either lampblack, charcoal, or some other colouring matter, and then removing so much that it does not come off

easily, but can be readily made by pressure with an ivory or agate point, to leave a mark on any white sheet beneath it. It is best to buy it ready made. One variety is advertised which is guaranteed to yield a hundred impressions. The smears from the colouring matter may be removed, or any alteration needed can be effected, by rubbing with a piece of stale bread.

CHAPTER IV.

WOOD-CARVING.

WOOD-CARVING is believed by many to be a difficult art, but its rudiments may be readily acquired by anybody from a book, and the pupil who masters them will find no trouble in advancing. It is very little harder to indent or carve a panel in low relief, than it is to trace and transfer a pattern to the surface of the wood, and then after a little practice in panels the pupil will find it easy to carve "in the round," that is, to make complete figures. The sum total of all the real difficulties in wood-carving consists of holding the tools properly, and in proceeding cautiously at first, and any person of ordinary intelligence can learn this, without a master, in two days.

Material.—American walnut, which becomes rich brown when oiled, is the favourite with beginners, but is it advisable to become familiar with oak as soon as possible. Lime or linden-wood cuts easily, and may be stained of any colour. The beginner may examine and try pear-wood, mahogany, and any other wood which he can obtain and select, according to his or her fancy.

Tools.—From ten to twenty shillings' worth of tools and material will suffice for a beginner, it being advisable that he should learn to do all that he can with the smallest stock and thoroughly master his implements as he proceeds. But buy only the very best tools of English make, avoiding the cheap and brittle German ware, which costs most in the end for grinding. When you can use them take carpenter's chisels and gouges. Avoid ready-fitted chests of carving tools, especially those sold "for ladies' use" with tools mounted in rosewood or ivory. Get ash handles, which should for beginners and people with small hands be not over three inches in length. If you must buy long handles, have them sawn off and well rounded with chisel, rasp, and glass-paper. As you progress, use longer handles, which give a firmer hold. The following plate gives the shape or cuts made by the principal instruments.

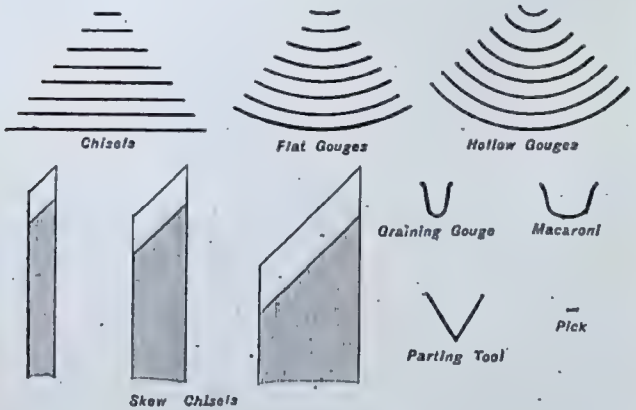

FIG. 54.

Fitted with a handle, these tools will cost about eighteenpence each. About thirty in all constitute a set, but half a dozen will be enough to begin with, and not more than a dozen will be wanted during the first year. A very important tool is the pattern-wheel, and to this may be added one or two punches

FIG. 55.

or stamps for backgrounds, costing sixpence each. A rasp and a bastard-file, or a half-round file, a mallet, a saw and plane, compasses, sand-paper, and glue, will gradually be added to the stock. But after obtaining the half dozen chisels and gouges which

FIG. 56.

will be described during the process of the work, the most important acquisition is that of a cheap, common table, the stronger and heavier the better; one into which nails must be driven and holes bored. Never carve except at such a table. It may also be used for sheet-metal work. For the beginner who confines his work to panel carving, a few nails—the

French points will answer to keep his wood firm, but in time a holdfast and a carver's screw will be wanted. The holdfast is very useful, but so many new kinds have appeared of late that the purchaser had better, when obtaining one at a tool-shop, be guided by his own taste.

FIG. 57.

Working.—Take a panel of well-seasoned lime, oak, or American walnut, six inches wide, twelve long, and one-third or one-half an inch in thickness. Draw or trace on any paper, of the same superficial dimensions as the panel, a simple pattern. Fasten this, with drawing pins or with gum at the edges, on the wood. Then take the pattern-wheel, which

FIG. 58.

is like a spur, and pressing its points firmly on the edges of the pattern so as to penetrate into the

wood, mark out the whole design. On removing the paper you will find the outline pricked in dots upon the wood. If you cannot obtain the wheel, use a piece of sharp new knitting-needle set in a handle or

FIG. 59.

a sharp bodkin. Now if you were to simply take the wheel or the sharp point, or a nail filed across twice at the point, or a sixpenny punch, and indent the background full of little holes, dots, or ragged work,

FIG. 60.

and then oil the whole, you would have a good effect. But to go a step further. Before indenting or grounding, take the V-tool or a very small gouge (∪), and

following the line of the pattern-wheel, keeping accurately close to it, outside, cut a light groove. Now attend closely to this advice. *Hold the handle of the tool in your right hand, keep the wrist of the left on the panel, and guide the tool with the forefinger, or with the fore and middle finger, of the left hand. Be very careful that neither the left hand nor any portion of it gets before the point of the tool, for should the latter slip you might cut your fingers cruelly.* If you undertake to carve a loose piece of wood by holding it with

FIG. 61.

the left hand while you cut, you will soon meet with an accident. Remember from the very first cut *to bear on lightly, to remove just as little wood as possible,* and to keep perfect command of the tool. Cut away a mere film at first, the less the better; be satisfied with a grain at a time, and make your cuts for a long time as short as you can. You will probably, in spite of this instruction and of the best resolution, be tempted into trying to get on rapidly, the gouge or

parting-tool or V, will dig in deeply, you will venture on a bold push, or try to pry up or break the wood, and then your tool will break its edge or slip. But if you will make the whole outline, at first, a mere indication, you will do well. Think only of learning how to hold the tool and how to acquire an easy mastery over it. It is very easy indeed to do all this, without being shown how, if you choose to cut very lightly. Most beginners are, however, in such a hurry to have some work to show as a proof of their skill, that they quite forget that the object of the first lessons is not to have something pretty to exhibit, but to learn *how* to carve. You understand that it is very easy to cut a *straight* groove from end to end of the panel, and only a little more difficult to go *across* it. But in running this groove from corner to corner, the grain lends itself to your cut on one side, and opposes it on the other. Therefore to cut deeply you must, to avoid tearing or splintering, cut one side in one way, and then turn the wood round and cut the other reversed. This continually occurs in all carving. Of course the resistance is less in close or fine grained woods than in those which are soft and fibrous. A very little cutting with a gouge on any waste bit of wood will render this perfectly clear. Practise on waste wood till you can run a line easily with any gouge. Having finished your groove-outline, go over it again and deepen it. Now take a chisel, say one fourth of an inch in diameter, or a flat gouge of the same size, and, still cutting as lightly and securely as possible, remove the wood between the pattern-edges. This of course will leave the pattern

in relief. When you first made the outline with a gouge ∪ or V, you were told not to cut too close to the dots. In fact, you should always let it slope outwards. Now in removing or cutting away the wood, begin close to the pattern, and cut very lightly, indeed with only half the edge on one side. This will leave a long mound or rising surface on the ground between the lines. Then shave this away very gradually until all the pattern is in relief. Make every cut clean, clear away every chip as you remove the wood, and never tear or dig the wood, but always *cut*. As General Seaton advises in his excellent *Manual of Wood Carving*, "Leave no rags, jags, or fragments, clear out completely every angle and corner; get your work as smooth as possible with whatever tool you may be using; and let every stroke of chisel or gouge be made and regulated by purpose and design." If the pupil can master the few simple rules which I have already laid down, and apply them; that is to say, if he can cut carefully, a little at a time, and the less the better, holding his tool as directed, leaving his pattern sloping outwards, till finished, he can carve wood. Hasten slowly.

You have now removed the wood from the background. Make it as level as you can. If you cannot get it quite smooth, you may scrape it with a chisel, a bit of window glass, or a curved file. Then, if desired, gently round the edges of the design with a rasp and sand-paper. It is not artistic to finish leaves or fine carving in this manner, but it may be done to imitate worn or old work, or to make a strong relief in light against the ground. If you cannot well

rub sand-paper into some places, take small sticks, cut them into suitable shape, dip their ends into strong glue, and before it dries put them into sand. When dry these will serve as polishers. When all is finished, dust and knock the sand well out of your work, and prick or indent the holes in the background with wheel, piercer or stamp. The deeper and denser they are the greater the relief will be when the whole is oiled. Then apply linseed or sweet oil copiously. Wipe it dry. If you wish to polish the pattern, use only oil, no beeswax. Then with a soft pine stick rub long and carefully.

In carving do not be deterred at first by the hardness of any wood. You can get to prefer oak to walnut with practice. Keep your tools very sharp. It is not necessary to give careful instruction as to how this is to be done, for there is hardly a place in the world where there is not a tool-seller, a carpenter, smith, or tinker who cannot show you the method. The V-tool and gouges differ from carpenters' gouges in this, that they should be sharpened somewhat inside the point as well as out, and this is done with a bit of Turkey or Arkansas oil-stone, called a "slip," ground down to fit the inside. Set it in a piece of wood, wedged in, and rub the tool on it, and you will not cut your fingers. When you can afford it, buy a revolving grindstone; until then, whenever you break an edge you must have it ground for you. After tools have been ground, or had their edges simply sharpened, they must be "set" on an oil-stone, which gives them the greatest keenness. For this, Turkey oil-stones are used for readily and roughly

setting, the Arkansas for fine finish. As you work, set your tools occasionally, and then strop them on leather. Wood-carvers' chisels are ground on both sides, so as to make a roof-shaped edge. Working a joiner's chisel, you must turn it continually, not so with the carver's.

Staining.—Stephens's dyes for wood, sold at all colour shops, may be commended. Mahogany can be so perfectly blackened and polished as to exactly resemble ebony. To give oak a mellow, moderately dark colour, wash it several times with soda, dissolved in water. To give any wood a dark walnut stain, take common umber, Cassel earth, or Vandyke brown powder (*6d.* a pound). Mix this with beer or strong coffee; coat your wood well with it; rub it off when dry, and renew it. To make it darker *ad lib.*, stir a little lamp-black into the umber, and mix with spirits. For ordinary black stain the very best *ink*, applied two or three times with a brush, is excellent. When quite dry, and oiled and polished, it will resist a great deal of moisture. Hard-woods may be stained rich red or brown by being lightly washed with sulphuric acid and turned before a very hot fire. The greatest care must be taken not to get the acid on your hands or spill it on the floor, since it will burn like fire. Have fish or olive oil at hand to apply in case the acid gets on your hands. Bi-chromate of potash powdered and mixed with water is an excellent brown stain. It colours best when applied in sunlight. As it is a poison, care must be taken not to expose the breath too much to its influence, or to drop it on the skin. Combined with glue, it makes

a waterproof cement. Strong aquafortis alone will stain hard-woods. They must be under its action for only a few minutes, and then immersed in water.

After carving any object in wood, you may stain it a rich light brown with Stephens's dye. Then, when dry, take ebony stain, or very black ink, and with a camel's hair pencil paint the ground, only with care, seeing that it does not soak into the brown. When dried and polished the effect will be very fine.

An ingenious method of staining wood was invented by Mr. Barton H. Jenks, of Philadelphia, which was thoroughly tested and found to be perfectly satisfactory. By it the wood to be treated is placed in a closed vessel, which is connected with an air-pump, and the air removed. The colouring fluid is then allowed to enter and permeate the wood, which it does thoroughly. The excess of fluid is pumped out as the wood is removed, and allowed to dry in the usual way. The following table exhibits the action of several dyes on white pine. Of course with darker woods the tones would be modified :—

1. Nitrate of iron—Warm light gray.
2. Nitrate of iron and paraffine—Warm light gray.
3. Sulphate of iron—Colder light gray.
4. Sulphate of iron and paraffine—Colder gray, dark.
5. Sulphate of iron and logwood—Colder light gray.
6. Sulphate of iron, logwood, and paraffine—Like No. 2.
7. Chromate of potash—Yellow gray, light.

8. Chromate of potash and paraffine—Yellow gray, dark.
9. Bichromate of potash—Yellow gray, between 7 and 8.
10. Bichromate of potash and paraffine—Very rich yellow gray.
11. Logwood—Light orange.
12. Logwood and paraffine—Dark orange.
13. Aniline blue—Bluish slate.
14. Aniline blue and paraffine—Bluish slate, dark.
15. Aniline red—Violet with yellow shade.
16. Aniline red and paraffine—A little darker than No. 15.
17. Aniline solferino—Rich purple.
18. Aniline solferino and paraffine—Rich purple, dark.

If a crack or hole occur in your work, make some dust with a coarse file from the wood, convert it into a paste with glue, and fill the cavity with it. For dark wood, powdered cocoanut-shell is admirable. With these dusts and Salisbury glue you can make artificial wood, which can be carved, or moulded, to replace any broken piece. Glue mixed with nitric acid while still liquid and warm may be kept in a liquid state, if corked in a bottle, for months. This glue has the valuable quality of not drying too quickly; but it has a sharp, unpleasant smell.

Wood Carving (*continued*).—If you really wish to carve well, to make the art profitable, and not merely play at it, do not begin with your head full of elegant frivolous modern Frenchy trifles, and meaningless bits of rococo, but cut several simple panels, preferably of

Gothic or Celtic design, in which lines and curves form the pattern. A real old Gothic panel is a treasure, since by studying it we learn how, with the fewest

FIG. 62.

and simplest tools, and the least amount of cutting, the best effects were produced. Do not begin with a leaf as a model. Simple flat carving should be mastered in detail before the varied and difficult curves of the simplest leaves are attempted. Leaves will come in time. Now, having learned to run an outline with V tool or gouge, and then to shave away the wood, you may, with any pattern, try "stabbing out." Take a tool corresponding exactly to the outline of the design, *e.g.*

FIG. 63.

the small mark indicating the edge of a gouge. Apply it accurately, *but sloping outwards*, and with a blow of a mallet, or a push with your hand, stab the wood. Having cut all round the lines, proceed to ground it, or cut down to a ground. With a flat gouge or chisel begin a little way from the cuts already made, and

cut towards them. Then with flat or half-round gouge clear the wood in the centre away. To avoid making mistakes it is a good plan for beginners, after pricking out the pattern, if the wood be dark, to go over the pattern with Chinese white water-colour and a fine camel's hair pencil.

If a panel should warp you must lay a damp cloth on the hollow or concave side, and keep the whole under pressure, or else hold the convex or rounded side to the fire. If you have a very broad and thin panel, split it carefully into two pieces, or make it of two such pieces, and glue them together after carving. I have seen Gothic panels thus made in two pieces.

Having carved a few panels, obtain a carved leaf, or a real one, and imitate it first in wax, clay, or moist leather. This is easier than carving, but it will lead you up to it very speedily. No engravings can equal the reality of relief to teach wood-carving. But we will suppose you have something like the following :—

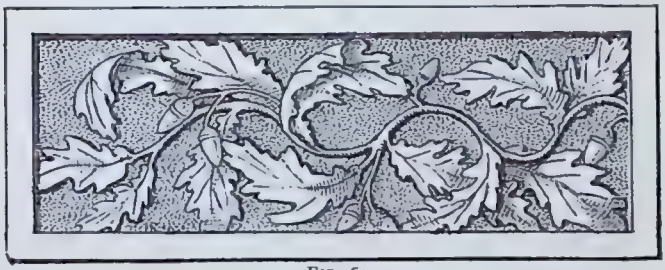

FIG. 64.

Having stabbed this work out, make with gouges the undulating curves and hollows of the leaves. Cut

from the points of the leaves backwards. Do not under-cut very much, or try to make the leaves very thin. Cut the hollows as much as you can, but you may use rounded files also. For oak-leaves, which are to be specially commended as studies, large, flattish gouges are essential. Practise on a piece of waste wood the making of deep semicircular "sweep-cuts," *i.e.*, pushing the gouge before you and confidently turning it around as you cut. When you can do this boldly, sinking the edge as you cut, and then raising it, or recovering it during the cut without tearing the wood, you can carve leaves well. This was the secret of Gothic carving, to readily master a bold and sketchy yet accurate style, to sweep without fear into curves and depressions, to *mould* the wood with the gouge. Be satisfied for a long time with simple tracery and oak-leaves, with animals roughly but effectively rounded; and do not think for many a day of humming-birds and plumes, inexhaustible acanthuses, and renaissance filagree. Stick to real leaves and study them. In making leaves which have lobes, or several points, like the ivy, begin by cutting out a single piece, and then cut out the notches between the lobes, going from the points inwards.

FIG. 65.

To level the ground, a flat or quarter-round gouge may often be used. Place it almost upright, and

work it along from side to side, cutting out these marks:—

FIG. 66.

Then go over it with the same motion sideways, these lines imitate the ruggedness of certain trees. If you carve a furred animal you can finish it with a kind of gouge with teeth, used by shoemakers, another, and a better one, is a rasp, which requires a peculiar drawing and sweeping, but which imitates fur exactly.

Running lines is the first process in wood-carving; *stabbing-out*, the second; *bosting* (from the Italian *abozzare*, or the French *ébaucher*, to sketch) is "rough ing out;" and the fourth stage is *finishing*.

A pretty and easy variety of work is the Sunk Carving, or Intaglio, which consists of patterns sunk into the wood, cut chiefly with light gouges. A knowlege of this is of great value to all workers of *cuir-bouilli*, or soft leather.

To carve a casket or box, do so while it is in pieces. That is, make it, or have it made, in dove-tail, or tailed and mitred, and after carving, join it together.

Wood carving is so closely connected with joining, carpentry, and fret-sawing, that a proficient in the first is sure eventually to learn something of the two others. The only way to really learn carpentry is to go to a carpenter, and as there is one in every village, he will not probably be far to seek. Fret, or buhl-work

is done, firstly, with the horse, which is a simple contrivance resembling a boot-jack, which is screwed on a table to receive the panel, which is simply worked with a peculiar saw, a gimblet being used to make the holes, or secondly, with a sawing-machine, of which there are many kinds. If you intend to sell your work you must use a machine. These cost from 30*s.* to 18*l.*, and it is not necessary to explain the manner in which they are used, as the dealer who sells them always gives with them full directions for using them, or will do so in detail. Fret-saws cost about 4*d.* a dozen, steel saw-frames about 3*s.*, fret-cutting boards, with steel cramps, 3*s.* In the various newspapers devoted to practical matters, such as *Design and Work*, the reader will generally find the advertisements of both tools and machines for executing, and works for studying every kind of wood-work. For books on wood carving I commend the works of Major Seaton, and Mr. Rogers for directions; and for elegant, easy, and practical patterns, the book by Mr. Hulme, published by Marcus Ward and Co., which should be carefully studied by all who begin this charming art.

It may be remembered that in wood-carving, as indeed in solid leather work and embossing metal, the stages from simply drawing and slightly impressing patterns, up to making objects in high relief, or "in the round," are almost imperceptible, and that by following them any one who can master a pattern may master these arts. And it is also true that very few books on these subjects recognise this principle.

The reader has understood, from what I have

written, that shallow cutting and grounding a panel is only a very slight advance on pricking out a pattern with a wheel; and that cutting a panel in high relief and with foliage must be very easy for any one who has spent, let us say, three weeks, at simple designs in low relief, strictly adhering to the rules which I have laid down. Now the deepest cutting will, in turn, be quite as free from difficulty, especially if we cut, as Grinling Gibbons did, from successive layers of boards and glue them together. From this point to "sculpture" in wood is as easy for the student who understands drawing and proportion, as any previous transition. *À propos* of these labour-saving layers of boards. You will often find that a single ornament will look well in high relief, as, for instance, a fox's head in the centre of a panel, or box-lid, or a wreath in a door. To avoid cutting away, perhaps pounds of chips, you will only need to carve the *alto-relievo* and glue it into the centre. In Germany, objects for thus finishing work are commonly sold in shops.

Carving "in the round" is literal sculpture, but it will present no difficulty whatever to the pupil who knows how to manage the tools, who has executed a little deep panel-cutting, and modelled a little in clay. To those who have progressed thus far, any instructions as to measuring and cutting will be needless. Carving game, such as wild ducks hanging by the legs, may be regarded as the first step in carving in the round, and there are abundance of models in it to be found.

CHAPTER V.

STENCILLING.

STENCILLING is an easy art, which deserves to be more generally known and practised. Nothing is commoner than to see farmhouses and cottages without a trace of ornament or of art, which might be made pleasant and cheerful to look at by the employment of cheap wall painting or simply by stencilling. If some of the thousands of tramps, hawkers, and gipsies who swarm along our roads would go from house to house as cheap art decorators—and that there is abundant intelligence, tact, and industry among them for this, I know—good might be done in a double sense. The ugly blank walls which form a standard subject of complaint with writers, might be covered with tasteful or interesting patterns at no very great expense. But even if a decoration should cost more than whitewash or wall-paper, it cannot be too earnestly impressed on the mind of every one in every way that it is a public duty and a charity to

invest money, whenever it is possible, in such a way as to give hand-labour allied to skill the preference to machine-art, and that by so doing we enlarge the area of industry. It may be truly urged that stencilling is a very low form of art, and allied to the merely mechanical; but low as it may be, its results, if inspired by taste, are far superior as regards human interest to a wall-paper, however "elegant" or æsthetic the original may have been, from which the copies were ground out by machinery.

Almost any outline pattern which can be painted can also be stencilled, but there are many borders and central pieces, both of classic and Gothic design, in which artistic taste is combined with simplicity or ease of execution. But if the stencil picture is not to be finished off at all by hand, it is important that it should have as few connecting bits as possible. These are the little pieces which must be left to connect certain portions, or islands, so to speak, with the continent or main body of a design. Stencilling, as the reader is possibly aware, is the cutting out of a pattern in any kind of strong thin leaf or sheet, in laying it evenly on any flat surface, and in painting through it with a broad even brush on that surface. The stencils may be made of cardboard or thin wood, —zinc, copper, and sheet-brass are preferable for small work, being much more durable, thinner, and less likely to absorb the paint or smear. The patterns are to be generally cut out with a fret saw, though different kinds can be made with scissors, files, and chisels.

When a pattern is to be very frequently repeated, a stencil becomes a necessity. It is a tedious process

to accurately reproduce all the points of a design, and these the stencil reproduces without seriously adding to its mechanical character. Assuming that you have a sheet of brass and wish to make a leaf-pattern which, frequently repeated, may serve as a border, a foot broad along the top of a wall, or be spread all over it.

FIG. 67.

First design the pattern on paper, paste it as in *repoussé* work on the metal, and mark it out with the pattern-wheel. Then wash away the paper, unless the pattern be a very large one, and saw out the design. Care will be required as to the bits which connect the "islands" with the continent. All of these bits will reappear in the painted work as blemishes, which must be painted out. The brushes used in stencilling are, of course, large

"dabbers," and either made with a broad flat surface like the *putois* used by porcelain painters, or flat and wide, so as to sweep evenly over a broad surface.

Stencilling is applicable to painting all patterns on paper, which can be generally represented by broad average uniform surfaces, or to any kind of dead colouring on anything. When flowers are painted on paper with stencils, they are said to be done in "theorems." The ground exposed is moistened freely with a wet sponge, and the colour allowed to spread freely. After one or more dryings and repeated applications of colour, the picture is again dried and finished by hand. This process in monochrome may be applied to leather work, to boxes made of light woods, or to panels, with very good effect. The wood-carver who wishes to produce a number of panels with the same pattern may save himself much trouble and time in his designs by stencilling them with black paint and cutting away the white. Something like this was known in the days of the block books which preceded movable types, and the process is still universal in China. The letters are either stencilled or drawn by hand on the wood. Stencilling is observed when the greatest uniformity is necessary. Then the white wood is cut away and the type remains. Very pretty patterns may be made by this first simple process in wood engraving, which requires but a few days without a master to enable most people to master it. Any printer will strike off the impressions.

Stencilling was, till within a few years, common on

all ordinary porcelain painting. Now that a demand for pure hand-labour has sprung up, it is confined to cheaper wares. It is, however, largely applied to tiles, where the profits must still be very great. There is the agency of a great "artistic" firm near my home, and the price there for a stencilled tile which did not cost them sixpence is six shillings. When a tile or water-colour or any other painting has been dead-coloured, or had its flat uniform coloured surface given to it by a stencil, it can be easily and effectively touched up with the brush.

There are published in Munich and sold by most of the toy-dealers and print-vendors in London, sheets of silhouette, or black figures, which may be pasted or copied on thin brass or copper, cut out, and the stencil thus made applied to light wooden boxes of all kinds; when dry varnish carefully with the best transparent mastic varnish.

If you wish to ornament a wall or ceiling cheaply, prepare your stencils. If you cannot get metal sheets, or cut them, cardboard or thin deal board will answer. Where the pattern is large two thin sheets of cardboard pasted together with "shoemaker's paste," will be found preferable to metal for the stencil plate, the latter being apt to "buckle" when used in large masses. When these cardboard stencils are used for distemper they should be painted over with a thin solution of shellac, dissolved in naphtha. This, under the name of "Patent Knotting," can be obtained ready prepared at any oilman's.

Any damask woven pattern suggests good motives for suitable stencil patterns, the cutting of the card

through which the loom works being performed on a precisely analagous system to that required for stencil plates. Where the work is desired to be very neatly executed, a second plate can be used, having the perforation cut to cover the connecting bits in the original pattern, and these little "isthmuses" then stencilled out so that the heretofore "islands" can be incorporated with the "continental" design, care being taken to preserve sufficient of the original colour for this purpose.

Talc powder, metallic bronzes, the waste grindings of glass cutters, when washed free from sand, may be blown or dusted on to the stencilled pattern whilst this is damp, and great variety and brilliancy is obtained by this method, but for this purpose the pigment should be made rather more glutinous than when dead colour only is desired.

Stencilling is not necessarily confined to wall decoration, and many very pleasant effects may be obtained by stencilling in distemper colour, or colour mixed with turpentine and varnish, on coarse canvas or linen for curtains, portières, and other purposes for which woven fabrics are used. In this manner very curious imitations of old tapestry are produced, the process being easy, and the result very beautiful. Messrs. Howell and James have for sale a kind of soft linen canvas, manufactured especially for this purpose, as well as the painted tapestries. By this means a room may be elegantly tapestried at a very small expense. The painting it by hand is by no means difficult, and if a pattern be purchased, the style may be very soon acquired.

The best way of cutting cardboard stencil plates in cardboard is to lay the sheet on a plate of glass and cut out the pattern with a sharp pen-knife; by this means a very clean sharp edge is obtained. If you wish to have an excellent whitewash or lime-wash for a ground, make it as follows :—Take of good unslaked lime half a bushel, and slake with boiling water, covering it during the process to keep the steam in. Strain the liquid through a fine sieve or strainer, and add of salt one peck, previously well dissolved in water, of rice, three pounds, boiled to a thin paste and stirred in boiling hot, one pound of clean, nice glue, which has been previously dissolved by soaking it well; and *then* boiled in the usual manner. Now add five gallons of water to the mixture, stir it well, and let it stand a few days, carefully covered over from dust. This whitewash has a remarkably brilliant lustre, and, it is said, will last thirty years. Colouring matter, such as Spanish brown, umber, chrome, coloured clays, or ochres, single or mixed, adds to its effect. Indigo or blue vitriol give a good blue colour. But if you find this too expensive or troublesome, a very good permanent wash may be made by simply infusing two ounces of glue to every four pounds of lime or whiting. This will not rub off. Having your ground very dry, take the coloured wash and with a brush paint the patterns. There are hundreds of places in London where you may have any pattern cut to order in stencil. Brown and blue are suitable colours for a white wall. Green should be applied in rooms with great caution, as it is often very poisonous. I have read that a green colour, not

inferior to that made from arsenic, can be made by melting 59 parts of tin with 100 parts of nitrate of soda in a crucible, and then dissolving it when cold in a solution of caustic alkali. The clear portion of this solution is then diluted with water and a cold solution of sulphate of copper is added. A reddish-yellow precipitate now results, which, on being washed and dried, becomes a beautiful green.

It should be remembered that by infusing glue into the coloured whitewash which you use for patterns it may be rendered almost like paint, and that this will be still further improved by adding salt. Glue becomes waterproof when mixed with bi-chromate of potash.

Wreaths of ivy or of grape-leaves are easily stencilled, and form graceful borders for any walls. Masks may be introduced among these at regular intervals, or, if you prefer, figures of animals, or human figures. Etruscan vases give many admirable suggestions for the latter. Fishes may be introduced among marine plants; these, with red lobsters and similar marine creatures, might be appropriately stencilled in the dining-room of a cheap house. There are few cottages or farm-houses where there are not favourable opportunities for stencilling walls and ceilings. A white-washed wall prepared in this manner, or a hand-painted one, is in every way preferable to paper, the best of which when acted on by dampness gives out noxious vapours. Old flour paste under paper, when it decays—and it is liable to do this at any time should it become moist—is often the direct

cause of fevers and sometimes of death. There are many practical reasons why the decoration of walls by hand should become general, and I sincerely trust that all readers will seriously consider on this and use their influence to encourage it.

CHAPTER VI.

MODELLING IN CLAY OR GELATINE, AND CASTING IN PLASTER OF PARIS OR PAPER.

MODELLING deserves especial attention from the students of many arts, since, apart from its relation to sculpture, it will be found that a little practice in it is a great aid in wood-carving, leather work, and papier maché. No one who has worked at it for even a few days will find much difficulty in working soft leather or slippery paper pulp into form. Modelling is, when practised with a view to baking the clay, an art in itself, and one which can boast its great masters as, for instance, Luca della Robbia. The material with which it deals is to be obtained at potteries, of plasterers and pipe-makers, and of dealers who make a specialty of supplying artists. Great care should be taken that the clay is free from hard lumps or grit of any kind. To ascertain whether this be the case, it should be carefully wired or cut in pieces with a piece of wire fitted with handles for

holding it. It should be then thoroughly worked or beaten into a consistent mass.

The tools for modelling are, in addition to the artists' own fingers, which play the most prominent part, a few simple wooden or bone blades or spoons and scrapers, with finely serrated teeth, or rather notches, like a saw. Mr. E. A. Davidson, in an article on modelling, especially recommends one which is not usually found in sets of modelling tools, but which is very useful (Fig. 68.) It should be made of

FIG. 68.

several sizes, from half an inch across the saw edge to an inch or three inches. As in leather work, the beginner will find it a great advantage, and, in fact, necessary, to be able to cut at a minute's need some peculiar tool from a wooden stick, of which there should always be a supply at hand. The smaller bone or wooden implements sold for modelling are simple and cheap, and will almost suggest themselves. It is needless to lay in a large stock of them; as soon as a little practice is acquired in modelling and turning clay the student will find out for himself what kind of implements he prefers. A board, stone slab, or slate is necessary to work on. It is advisable that the first efforts should be copies. If you can obtain any simple object, let us say the image of a rabbit or dog, carved in stone or wood, or cast in plaster, it will not be too difficult for you, especially if you have had any

practice in drawing. First prepare the ground or base, by spreading clay to the requisite thickness, and kneading and patting it well into a solid mass. To make it perfectly level, place flat pieces of wood at the sides, and scrape it with a straight ruler. Then with the hands form the rabbit into a general rude shape, rather by taking away, at first, than by building up. Take the points of the original accurately with large compasses, until you are certain that it is in the main correct, and nowhere too scanty. Any superfluity is easily removed; additions are, for the beginner, more difficult to manage. Now proceed to connect the whole with great care, scraping away, and not cutting with your tool. The eye and practice alone will enable you to catch and correctly imitate all the contours, lines, and hollows of the original, but rest assured that if you work faithfully and assiduously for a few days you will be perfectly able to copy any simple object. To form the eyes and indentations of the ears, you will use alternately the point of your bone tool, turning from one to the other. In the larger mouldings the fingers will often be required to press the clay in or work it out.

The general outline being attained, the hair may be imitated with the scraping or wire tool, on the same principle by which a rasp is used for a similar purpose in wood-carving. Where there is long and "locky" hair, as on a dog, the bone tool is freely employed, scraping deeply to form the masses and indentations, and the mere point for the detailed lines. Of later years great advances have been made by sculptors in modelling, so as to give the effects of

light and shade, especially in the human countenance. To indent or "ground," as we say in wood-carving, that is, to intentionally indent or roughen the base or other parts of the work, so as to make a relief, we employ the wire tool. As there is no art in which the tools and material are so simple as in modelling, so in proportion there is none in which the pupil is so self-dependent. Having his clay and a few very simple tools, he must work nearly all out for himself, there is very little which can be shown him or done for him. In a studio, or with a teacher or companion he may catch the spirit of work and be inspired with lines and contours, but in the main all his progress will depend on his own innate taste and his industry. It may be here remarked that the proportion of boys or girls who learn very rapidly to model well from originals is very much larger than would be supposed, and that many who are dull at drawing speedily learn to shape figures in clay with considerable cleverness. The reason for this may be that clay is a tempting material for all young people—as is instanced in the instinct for mud pies and sand forts; but in fact outlines of solids are more intelligible to children, than diagrams. I believe that with most rude races, images of birds and fishes or other simple forms are made in pottery long before the art of drawing them is as well, or at least as generally, developed.

Having modelled a rabbit, a dog, or a simple vase, the pupil may attempt leaves (see cut on p. 63), which are in reality more difficult than the simpler forms of animal life. As a rule they are best made by pressure and by removal. Begin by copying leaves carved in

wood or cast in metal. You can hardly fail to obtain something of the kind by inquiry, but as soon as you have caught the art, and learned how much thickness as a rule is left to every leaf, then imitate from nature and from drawings. Do not attempt to make thin leaves, but sketch the general effects. Scrape away freely with the serrated or toothed tools, removing the clay first in one direction and then another by crossing the lines. When you can model foliage well you will be capable of making almost anything in clay.

You may now obtain the cast of a hand or foot, which you should copy with the greatest accuracy. In such work deliberation and care are sure to succeed, but impatience and hasty sketching always lead to failure and discouragement. Get every point with rule and compasses, and you cannot go wrong. If you succeed in copying half-a-dozen hands and feet—and you can easily buy or hire the original models from any plaster image maker—you may attempt a bust. Many begin at once with a head in this manner, and it may be added that a great many also give up in despair from having been too ambitious, and from having attempted to run before they could walk. But I venture to assert confidently that in modelling in clay there are few people who are not capable with patience of mastering the rudiments, and fewer still who when they have mastered them cannot go on.

When your work is done for the day, but as yet unfinished, it is to be kept damp by carefully covering it with a cloth which is moderately wet, and to be kept so from day to day by sprinkling. These directions thus far refer particularly to such modelling

as is to be reproduced in plaster casts, or perhaps eventually in marble or metal. But there is another kind of small modelling which has become very popular of late: I refer to the making of statuettes, small images of animals, pipes, vases, &c., in plain, or more generally in coloured, clay, which when finished are carefully dried, sent to the potters, and baked. This is a very pretty art, extremely easy, costing little, and capable of being practised even in a drawing-room without "making a dirt." The tools requisite are small and simple, similar to those used in leather work. Several excellent ones for this purpose may be made with a file from the round ends of steel pens, which may then be set reversed, in a penholder, for a handle. Great care should be taken to have the clay in the finished work homogeneous with the rest, that is to say, of the same grain and texture. Thus, for instance, the handle of a jar, if simply stuck on to clay which has become dry or smooth, will generally fall off in baking. Therefore rely on removing and pressing in, as in wax modelling, more than on sticking pieces on. Should you develop any skill or taste for such work you may find it very profitable. The art is much cultivated in France. For models for a beginner, carved briar-wood and meerschaum pipes afford many admirable subjects. At Dieppe they make of red clay baked, pretty little half-figures, which are put into sea-shells, whence they seem to be issuing as if they were human snails. Nearly all of the designs for wood-carving and leather work may be applied to modelling in clay.

When a work is modelled in clay, it is, so to speak, only in a transitory state, or unborn. It takes its life when cast in plaster, and becomes immortal in marble. Casting in plaster is simple in detail, but somewhat difficult of execution, it not being strictly one of the nice or neat arts, though it is unquestionably a very useful one. The material used for it is plaster of Paris, that is to say, calcined gypsum, which resembles flour. This powder has the peculiar property that when mixed with a due proportion of water it remains for about a minute perfectly liquid, during which time it adapts itself exactly to the minutest corners or indentations of any hard substance with which it comes into contact, and then "sets" or hardens very rapidly. When perfectly dry, and oiled, it may be used as a mould to pour another infusion of plaster on; and this forms the basis of the art. That is to say, fill a bowl half full of water, and pour into it gradually the plaster, until it absorbs the whole of the water. Then stir it with a spoon for a moment or two until it attains a consistency suitable for working.

It will be readily intelligible that if you have, let us say, a panel or any flat surface to cast, a single coat or piece of plaster will repeat the original. If it be somewhat hollow, or even half a sphere, this can still be made. But to make a mould of plaster around a sphere such as a peach or an orange, you must divide it into halves. Then if the fruit be taken out and the halves be re-united, oiled, and a hole made through which fresh plaster and water or "slip" is poured, the result will be a copy of the fruit

in plaster. But to mould anything more complicated than a simple solid, as for instance the human form, the mould must consist of several pieces.

Let us suppose that you have modelled in clay some simple object, for instance a flat panel, of which you desire a plaster cast. Take some clay or bees-wax, and make a wall round it two or three inches high, or else set it in a cardboard box, the sides of which are of the same dimensions. The clay having been already thoroughly dried, oil it at least twice, using a brush and boiled linseed oil, into which while boiling a very few drops of bees-wax have been infused. Wipe it dry. Then take the plaster of Paris and mix it in a dish with water, stirring it up very rapidly and thoroughly, so that there may be no balls of dry powder. Pour the "slip" from the dish over the model, till it is of the requisite thickness, and as soon as this is done give it a shaking or tapping, so that it may thoroughly fill the mould. In about ten minutes the plaster will have hardened, though it will still be damp. The plaster now adheres to the mould. Before separating them, shave the edges with a knife so as to see the line between them. They may now be separated with a broad dull kitchen-knife. Leave the cast in a dry warm room, and in twenty-four hours it will be quite hard. Clean the mould nicely with Dutch rush (*equisetum*), or very fine glass-paper, and finish with a dry sponge. You may now correct, touch up, and improve your cast in detail with scrapers and chisels, or grounding tools. The cast made, it is in turn oiled and treated as the

original was, that is to say, *slip* is poured on it and hardened, and when dry taken off. You will then have a facsimile of the original.

If milk and water be mixed with the plaster, or a little oil in which wax has been dissolved be applied to the surface, it will when dry take a high polish, and if kept for a while in a smoky room it will acquire precisely the appearance of old ivory. A more effectual method is to dry the cast thoroughly by subjecting it for forty-eight hours to a temperature of 300° Fahr., then steep it in olive oil or white hard varnish. Then immerse it several times in warm water, dry it and polish with whiting or putty powder, by which it will obtain an ivory-like surface. By mixing blue or aniline, or in fact any dissoluble colours in the water with which the plaster powder combines, the most beautiful tints may be produced. If liquid gum-arabic and sufficient alum in solution be mingled and put with the slip, the cast will be so hard that it may be set as a panel in a cabinet. If umber-powder, beer, and lamp-black be used as a dye, facsimiles of oak panels may be made.

Gelatine moulding is effectively the same with plaster, only differing in this, that other and more manageable material is used. It receives finer impressions than the plaster slip, and is a cleanly substance to deal with. The gelatine, when softened into a liquid state with cold water, is poured on the mould and allowed to harden, which it does however not perfectly, but enough to allow a cast to be made on it. By adding to the gelatine before pouring it upon the pattern a few hundredths of tannic acid,

it will form a kind of leather and resist the action of liquids better. French gelatine, which is the best for moulding, may be had at the shops which supply materials to carvers and gilders. In France, bread or dough is used for taking casts. It is pressed in with a stiff brush.

It is often desirable to take an impression of, for instance, a tomb-stone or a basso-relievo. This is easily effected by taking any kind of soft paper, wetting it with water, and pressing it on the surface. If it tears, as it probably will in several places, put on another layer, and on this several more, pressing them into every chink with a sponge. If you can use gum or paste to connect the layers, so much the better, but take care that it does not dry and reach the stone, causing the "squeeze" to adhere. When dry, this may be used as a mould from which to take a plaster cast. By this means travellers in the East have often secured perfect facsimiles of inscriptions which it would have been impossible to copy in any other way. If the mould be too slight or bent, it may be made solid and strong by pouring plaster and water on the back, or it may be strengthened with gummed calico.

To make piece-moulding, that is to say, to make a mould in more than two pieces, great care is requisite. Thus, to cast an object requiring three or more pieces, a fine twine is passed carefully around it, the twine being waxed and made to adhere to the places where the lines of junction of the mould are to be. When the plaster is just at the proper state, neither too hard nor yet too soft, the twine is pulled through it, cutting

the mould into segments. Or it is divided with a broad dull knife, while in some cases it is cast piece by piece, the one being adjacent to the other. The knife should be used with great care.

Wax fruit is easily made. Take the fruit, make the cast around it in plaster and divide it. Having extracted the fruit, join the two halves of the mould and pour in the white boiling wax. This may either be tinted while in a liquid state, or painted after being taken from the mould.

Papier maché is often used for making casts, especially in stereotyping. It should be well hammered, or firmly pressed on the object to be cast, and then dried while under pressure. Any soft paper may be used.

CHAPTER VII.

MOSAIC WORK

A MOSAIC is a work of art in which a design is produced by joining together small pieces of "hard substances either naturally or artificially coloured." Stone and glass are generally used for the purpose, the former greatly predominating. A true mosaic is one in which a number of pieces are combined. Another kind, such as some of the so-called Florentine mosaic, in which the designs are cut out of a ground, which is then filled in, is properly inlaying, as is explained by Sir Digby Wyatt and the author of the article on "Mosaics" in *The Industrial Arts* (Chapman and Hall), to which I am greatly indebted for this chapter. The art of mosaic-making is of extreme antiquity, it being almost instinctive with man, as soon as he attains any idea of decoration, to lay parti-coloured stones together in patterns. The rudest and simplest form of the art is that occasionally practised by railway officials, resident at the stations, in all parts

of Europe and America, who put together black and white pebbles so as to form the name of the place, this being sometimes decorated with patterns. In Norfolk and Suffolk, flint pebbles are thus used in building with very good effect, the style being in any kind of building more attractive than plain brick or plaster. Mosaic work of a very delicate description, and used as jewellery, was made by both the Egyptians and Assyrians. In the Book of Esther there is mention made of a pavement of red and blue and white marble. But the Romans carried this work to a greater extent than any people before or since their time, and I believe that no Roman house or villa has ever been discovered in England without mosaic pavement. There are, in all probability, hundreds of them as yet lying deep underground in the city of London. It is very much to be desired that mosaic should again become very generally used, both for pavements and walls. Considering its extreme durability and the ease with which it may be kept clean, it may be called cheap, especially in the coarser kinds. Wherever stone of tolerable hardness and of two kinds of colour, or shades of colour, can be found, there the chief material is ready. It requires, it is true, some little skill to break stone into the small square fragments necessary for the work, but even this may be acquired by practice. Writers on Roman mosaics divide them into four classes. Firstly, the *tesselated*, which consisted of small pieces of marble, generally from three-quarters of an inch to a third of an inch square, and varying from a cube to an inch in length. Secondly, the *sectile*, or sliced

work, made of different slices of marble, of which figures were made or effects produced by harmony of colour. Thirdly, *fictile* mosaic, composed of small portions of mixed silex and alumina, coloured by metallic oxides. Fourthly, the *opus vermiculatum*, which "was applied to the direct imitation of figures, ornaments, and pictures, the entire subject being portrayed in its true shades and colours by a judicious arrangement of small cubes of differently-coloured marbles, and where extreme brilliancy was required by the aid of gems." Some of this—the *opus majus* —was very large and coarse ; the *minus opus vermiculatum* was extremely fine.

Mosaic stones ready for work may be purchased at several places in London. The reader may, however, try his hand with hammer alone, or with a stone-chisel, at breaking stone into cubes and triangles. The two methods, modern and ancient, as given by the authors to whom I have already referred, of setting the cubes, is as follows :—Having your pattern before you, you may follow the modern Roman method. By this a plate "generally of metal of the required size is first surrounded by a margin rising about three-quarters of an inch from the surface. A mastic cement, composed of powdered stone, lime, and linseed-oil, is then spread over as a coating, perhaps a quarter of an inch in thickness. When set, this is again covered with plaster of Paris, rising to a level with the margin, upon which is traced a very careful outline of the picture to be copied, and just so much as will admit of the insertion of the small pieces of *smalto*, or glass, is removed from time

to time with a fine chisel. The workman then selects from the trays, in which are kept thousands of varieties of colour, a piece of the lint which he wants, and carefully brings it to the necessary shape. The piece is then moistened with a little cement and bedded in its proper situation—the process being repeated until the picture is finished—when the whole, being ground down to an even face and polished," is regarded as finished. But the cement used by the ancients to set their mosaics in was a mixture of slaked lime and powdered marble, blended with water and the whites of eggs. "This, called *marmoratum*, like the *chunam* of India, was intensely hard, and set almost immediately, so that it was impossible to make alterations in the work without destroying portions of it. To compose the bed a layer of large stones or flints with very little cement was first placed upon the ground. Upon this was spread a coarse concrete of smaller stones and lime, which was beaten down and compressed with much care until its thickness was reduced from one foot to nine inches. The third layer was a cement composed of one part lime and three of broken brick, shards, &c., worked to a true face, upon which was drawn the outline of the design. The tesseræ, or small pieces, were then arranged in their places, and over all was poured liquid cement to fill up the spaces." It was then carefully polished.

A simpler method of working in mosaic is practised by the Italians, who roughly draw and tint in the required colours on a sheet of paper the pattern to be executed, and then arrange the materials to be used

in a divided box, not unlike a compositor's type-case, which is set up before him. From this he selects the required morsel, and first dipping it in strong paste, he affixes it in its proper place on the drawing or "cartoon." When this has thus been entirely covered, a liquid cement is poured over the back of it, the mosaic now being face downward, so that the whole adheres in one concrete mass. When dry, this cement is scraped off to a level surface, and imposed as one plaque on its permanent bed of cement, and the paper cartoon ultimately washed off. When this pattern is repetitive, the labour of re-drawing each portion is reduced by placing several sheets of paper under one another, and pricking the outline of the design with a needle through these several sheets at once. This may be done with the pattern-wheel. Chippings of any coloured marbles may readily be obtained from the marble mason's yards, and then broken into the required shape by a smart sudden tap from a bricklayer's hammer, which has one end chisel-shaped and the other square, the morsel to be fractured being held by the thumb and finger on a small square bar of iron. Care however should be used in selecting materials of the same degree of hardness, as otherwise the softer ones are rubbed into a hole before the harder ones are ground down to a level surface in the final operation. Fragments of various coloured paving tiles are useful for the brighter colours, and most of the red tones in the Roman mosaic pavements found in England are procured from these sources. The vitreous mosaics can be procured already broken into cubes from Salviati

in Regent Street or the Murano Company in St. James's Street, and other Italian glass shops.

A very beautiful effect is produced in mosaics by the introduction of the gold-grounded tesseræ, which, at first employed by the Romans, were used to extravagance by the later Greeks and Lombards. These were made as follows:—"On a piece of vitreous compound—in shape and size a thin tile and unburnt—a sheet of glass was laid, and over that a piece of gold-leaf covered by another sheet of very fine glass; the whole, being placed in a kiln, was burnt to such a point as to render the union of the parts perfect, and make the whole tile homogeneous in substance." The reader may, however, make a very good and useful gold tessera by the simple process of coating pieces of glass very lightly with mastic varnish, laying gold-leaf on it and uniting them. Mastic and isinglass, or Turkish cement, is even better.

There is another kind of mosaic, known in America as *scagliola*, which is very easily made and very effective. This term, *scagliola*, is not used in England in reference to mosaic, being solely applied here to cements coloured with mineral oxides, and made to imitate marble. In Italy, *scagliola* means artificial stone. In the American *scagliola*, fragments of stone of all sizes and colours are imbedded in *marmoratum* or any firm cement, to which, however, a yellowish hue is given by introducing a dye into the water, and when dry the surface is very carefully polished. This composition often imitates coloured marble very accurately. Anybody can make it, or have it made under his directions. It is

extensively used for pillars and table tops, and it might be as extensively employed for pavements and for filling in broad tablets in walls. For pavements, Portland cement or *marmoratum* should be employed as the basis in which to imbed the fragments of marble; for walls and all objects not subjected to direct attrition, plaster of Paris mixed with alum and dextrine would be hard enough.

It is easy enough to make designs in *scagliola*, or "mixed work." The stones, not larger than gravel, and varying from that to powder, are set in tin or iron boxes, with the cement forming concrete blocks, each block being a pattern—let us say, a diamond or anything ornamental. When dry, these patterns are set in a bed of a different colour and smoothed, and when this is again dry the whole is polished by holy-stoning and with sand. A good cheap pavement of this kind is made by mixing irregular morsels of divers coloured marbles together, and rubbing them down when fixed with a plain or coloured cement. This is called "mischiato," and is in fact the *opus incertum* of the Romans. It is easily manufactured, and may be used for panels of cabinets, walls, and concrete blocks. Vases and many other objects may be made of this *mischiato*, and also panels for cabinets, which are very effective. These should be set with *marmoratum* and very highly polished. I have seen shop-counters in America made in this manner which have lasted for years, and also the slabs of drawing-room tables, chiffonières, &c. It is very cheap and profitable; its value depends, however, in a great measure on the taste of the maker.

CHAPTER VIII.

REPOUSSÉ WORK AND SILVER CHASING.[1]

REPOUSSÉ work is the term applied to sheet metal in which ornamental patterns are pushed out, that is to say, raised in relief. It is also called, in its degree, embossed or chased work. This is chiefly effected by a punch and hammer. In its simpler stages, where only very thin and ductile metal is employed, the art is very easy, and may be successfully practised by any amateur who can mark out or transfer a pattern. Nothing can be simpler than the tools with which to begin. I have seen in Nubia silver bangles, or bracelets, which had been made in the interior with only a nail and a stone for a hammer, and though the work was not "finished" like the machinery-made jewellery of London, it was still artistic and characteristic. The reader should always bear in mind that what is

[1] I am greatly indebted for many suggestions in this chapter to Mr. Karl Krall, of Barkentin and Krall, Regent Street, goldsmiths and metal workers to the Ecclesiological Society. Amateurs may obtain from them sets of tools and all the materials requisite for the work described in this chapter.

hand made in art, with any degree of skill, has a certain value of its own, and a peculiar merit which disappears with every artificial improvement in the manufacture. For it is as the work of man, and as bearing the impress of a *mind* and of an individual, that art-work is properly interesting; and this feeling is so greatly on the increase, that there can be little doubt that we are gradually approaching an era when it will be the true standard of excellence. Should it once be universally established, decorative art will become as real as it is now soulless, there will be an infinitely greater interest taken in it, as was the case in the Middle Ages and classic times, and it is very probable that the majority of those who are now idle will then be able to find profitable employment. For it cannot be denied that machinery, while it has added enormously to the average comfort of the world, has, for a time at least, not only deprived the art of daily life of all interest, but also benumbed or destroyed the tendency to create in art in minds which were peculiarly fitted for it.

If the pupil will obtain a piece of the thinnest sheet brass, say twopence worth, he will find it so soft and pliable that he can indent or draw a pattern on it with a pointed wooden stick. If he will lay it in a hollow place, saucer-shaped, cut in a board, he may, by gradual and equal hammering or rubbing in of all parts, gradually make it into a hemisphere. There is, indeed, a machine by which a sheet of brass is instantaneously "spun up" into a tea-kettle. Now if a piece of very thin brass be laid upon or be backed by some substance which only yields to hard

pressure, it is evident that it can be no difficult matter to indent patterns on it. The thinner the sheet the easier the work, and those who acquire the rudiments will soon advance themselves to the higher branches.

Take your thin brass and design on it a pattern with ink. Or you may draw it on paper: paste the paper on the metal and prick the design through with a pattern-wheel as in wood-carving (*vide* page 74). Then wash the paper away, and the pattern will be found in dotted lines; or you may work directly on the paper without using the wheel. Now lay it on a block of lead half an inch thick by six inches in length and breadth, with a "chaser's hammer" and "tracer," mark out the outline, very slightly at first. If you cannot obtain the leaden block take a smooth board. It will aid you very much if you turn down the metallic sheet over the edges, as it is apt to curl up. The punch which you will use at first is called a tracer, and is like a narrow dull chisel.

FIG. 69.

Almost any watchmaker or working jeweller or dealer in hardware can either obtain punches for you or have them made. They are almost endless in variety, as all workers in metal constantly need some new pattern of punch for some new emergency. But the pupil need not be alarmed at this. If he can obtain only a French round nail, or *point de Paris*, such as are sold at threepence per pound, and will dull the point a little by rubbing it on a stone to

keep it from going through the brass, he will have a very good punch, or one at least sufficient to indent the ground. The pattern-wheel may also be used for this purpose.

Begin by going all over the pattern with your tracer very lightly indeed in outline. If you begin by hammering in deep hollows and furrows on one side of the pattern while there is no indentation

FIG. 70.

on the other, you will bend the lines into awkward shapes, inclining to one side or the other. After slightly outlining the whole, go over it several times in the same manner.

When you shall have got the design into sufficiently bold relief, take a punch with a broad end and hammer in the background between the patterns, going over the whole design at the base of the pattern. As you work on you will find that the pattern stands out or rises more and more, and with labour this projection may be greatly increased. The greatest care must be taken not to break through, crack, or make holes in the sheet. Or you may begin by beating in, but the usual process is to begin by outlining. The process is similar to wood-carving. It is needless to say that this is rough work, but it is equal to that of many of the very pretty Algerine bracelets

which are so much worn. If you can obtain one or more of these, you will find them easy to copy.. For the circle and semicircles you can find punches of every size at the tool-shops. The object of working in brass is however not to make jewellery, but firstly to become familiar with metal and the effects of tools on it. Then, if you wish to make something ornamental and useful, you will have opportunities enough. Of the thinnest sheet-brass you may make panels which will look very well. If you take it of the thickness of a playing card, or rather more, cut it into a strip of about four inches by twelve, turn three inches horizontally, you will have the basis of a sconce or hanging candlestick. Hammer your pattern in the sheet, punch out a small round hole to hang it by, and get the tinman to solder a socket on the projecting portion to set the candle in. These reflectors may be made oblong, round, or oval.

You will, as you use thicker sheets, wish to hammer sometimes *from* the back into the raised patterns, either to produce a deeper relief, or to smooth and correct inequalities. For this purpose you must make a bed of so-called *pitch*, which when hard yields only gradually under the hammer. This pitch is made of brick-dust, or plaster of Paris, or fine sand, or ashes, mixed with pitch or resin in equal parts, and a very little tallow or turpentine. Pour this on the face to the depth of two or three inches, and you will find that you can indent the metal very easily. Thus if you have a sheet-brass cup, or plate, or broad salver, you can fill the cup with the pitch, or back the salver, and cover the other side outside with

work. Many persons prefer to "fox," or stick every article which is to be chased, on the pitch block. This is a block of wood or iron of about eight inches diameter, which rests on a ring of leather or straw. Its top is covered with pitch, which is warmed when a new article is pressed into it.

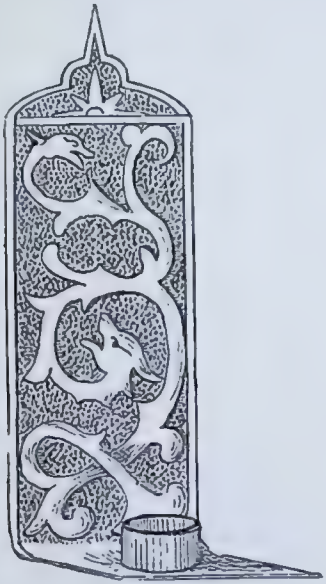

FIG. 71.

A great deal of the so-called and supposed Arab brass work of this kind, covered with Arabic or Persian letters and designs, is made in Paris by Frenchmen. I have myself seen them working at it. A fine large circular piece of sheet-brass, of eighteen inches or two feet in diameter, is easily

made into a handsome platter. Take a wooden hammer or mallet, the ends slightly rounded, and beginning at the middle, hammer the flat plate gradually into a saucer shape. Sometimes the middle alone is hollowed out, leaving the margin flat. Imbed it in the pitch and beat out the pattern as before from the back. Clean out the composition with spirits of wine, reverse it, and finish the face. These may be used as waiters, or when not in use, hung up as ornaments.

It is advisable after preparing the bed of pitch to give it the thinnest possible coat of oil. This causes the metal to work better on it. If there is too much oil it will not adhere. It is often necessary in heavy metal and in working deep relief to *anneal* the work. This is effected by placing it on an even bed of coals till it becomes soft, and then removing it very carefully with pliers. Annealing oxidises the metal. It must then be cleaned by boiling with sulphuric acid, mixed with from six to twelve parts of water. With thin sheets of good metal annealing for amateurs will not be necessary, especially for very low relief.

The lady amateur will find that the easiest object to make is a sconce or brass finger-plate for a door, three inches broad by seven or eight. It may be made of the thinnest brass, with only a nail. When the pattern is done, any worker in metals will mount it for you in a narrow strong thin brass frame, in which there should be holes made through which the screws pass which fasten it to the door.

There are more elaborate and artistic methods of metal work practised, but I have limited my

description of both process and instruments to the simplest for the sake of encouraging the beginner. If he chooses, he may now apply his skill to make a rough silver bracelet. He had better begin with a simple flat circlet or bangle, like a napkin-ring.

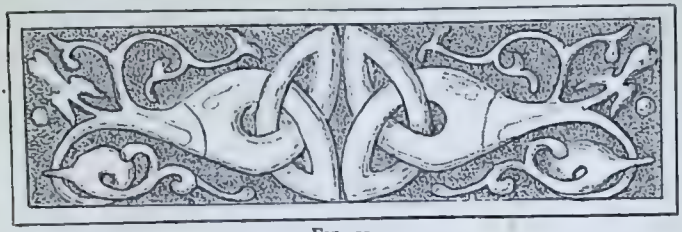

FIG. 72.

Take a piece of wood, round, and of such a size that the bangle will slip very loosely into one end. Wrap newspaper around this very smoothly and neatly, so that the ring will fit on it *very* tightly, or else pitch it. The pattern being drawn, hammer it out as on brass, and finish in the same manner.

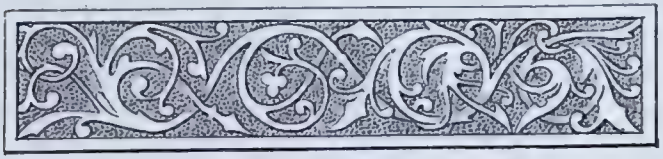

FIG. 73.

This is not a scientific method of working, but it is easy for amateurs, particularly ladies, who have few resources and cannot manage pitch. Silver is tougher and harder than brass, but finer in quality, and is in the end the most agreeable material to manage. With all your care you will probably break

it in a few places at first, and get some holes through. These the silversmith will solder up for you, until you learn to do it for yourself. The bangle plain, of good silver from two to three inches in breadth, should cost from ten to fifteen shillings. Should it grow blackish in the ground, do not remove it, but polish the pattern as much as you please. This will produce a niello-like relief, and cause it to shine more by night in reflecting light.

The art of engraving silver is not difficult to acquire in its simpler stages. The tool, which resembles a wood engraver's cutter, is held and guided in most positions as in wood-carving, and two or three days' practice on a zinc block, or on the back of a piece of stereotype-plate, will enable anybody to cut ordinary curved lines with tolerable accuracy. A few of the simplest ornaments and dots will add very much to the effect of your silver bangle, and they may be introduced into brass-work. The art may be said to consist in, firstly, running a straight line or groove in the metal with perfect accuracy and confidence; if you can do this with a pen and ink or with a lead pencil you can very soon do it with a graver. Secondly, you must learn to gradually deepen the line and then "slender" it again, and this art acquired, to do the same in curves and twists. This bending is more difficult, but with it the main difficulty in common line engraving ceases.

If the pupil intends to work seriously at this elegant and profitable art, he should learn to make his own punches. Let him buy at a tool shop some of the *square* steel rod or wire made for this purpose—say a

piece three feet long by one-eighth of an inch square, and divide this with a triangular file into nine equal parts. Thin both ends of each part a little (*vide* cut of punch, p. 119), and file one end into the shape required for the work in hand; *i.e.* into a square, a convex surface, a straight tracer edge, a diamond or a cross-groove as it may be, harden this end by heating it in the yellow part of a gas flame, and dip it into oil or water when yellow hot. The punch will then be ready. With a little practice you will make perfect tools. It is often impossible to find what you may want in any shop. Brass or silver may be easily *etched*. Cover the metal with varnish, let it dry, and then draw your pattern with a sharp point, say a needle, simply removing the varnish. Put strips of wax around the metal, and then pour on it one part acid to three parts of water. Brush away the bubbles as they gather, with a feather. Then pour out the acid and water, and wash clean with turpentine. Or you may coat the bracelet or brass plate all over back and front with varnish, and put it into a cup or plate full of the acidulated water. Add acid in proportion to the hardness of the metal.

CHAPTER IX.

MINOR MANUFACTURES.

THERE are a number of little easy manufactures which, considered within the limits of this book, scarcely deserve a chapter each, yet which involve some knowledge of art, and which, as supplying pretty and curious ornaments, are worth describing. One of these is the small art of ornamenting oyster-shells. I have heard it stated that the Emperor Napoleon III. once offered a reward to any one who would discover how to make common oyster-shells useful—I suppose by some other way than by burning them into lime. Whether any one claimed the reward I do not know, but I have found by experiment that the shell of an English native may be converted into a very pretty object. Let the reader select a nice large flat shell, carefully avoiding one with white spots or spaces in it, as these are all soft and imperfect places which can be dug away with the greatest ease. Then let him trim the thin edge carefully with a strong pair of common scissors

or with a file, till it is smooth and even, and in no danger of easily breaking away. He may now design with a lead pencil on the shell, let us say the outline of a fish. Then take a small rasp or tolerably strong file without a handle, and with the end sharply pointed, and let him very carefully and very lightly scratch the outline. Then let him go over it, deepening it until the line is well established. This done, take the rasp or file portion and very carefully scrape and file away the shell for a quarter of an inch outside the line until the fish is in relief. With a little practice this will be easy work, as the shell is so soft. When finished, scratch or etch with great care the gills, eyes, fins, and scales, and lines of the tail. This will look well as it is, but it can be greatly improved. Take transparent colours such as are sold for magic lantern slides, and paint the fish or background, one or both, with these colours, not forgetting a gay crimson, orange, or blue band around the edge of the shell. The beautiful pearly tint of the shell will give great richness to the colours. Touch the whole up with gold paint. Or you may gild the fish entirely, painting up the lines and scales with different tones of brown. When finished, coat with best light mastic varnish. These shells, though fragile, may be set in picture-frames and cabinets. I have found, however, that when neatly executed and suspended by a ribbon passing through a hole drilled near the hinge, that they are much prized as curious trifles. Of course the real pearl oyster-shell, the nautilus, and others of a fine quality, when ornamented and painted in this manner, present a much better appearance. It is

not, indeed, necessary to etch the shell at all, as it can, of course, be painted with transparent colours and varnished so as to produce a fine effect. It can also be covered with etching varnish, engraved, and bitten out.

In the centre of every American oyster-shell there is a purple place known as the wampum-spot. Before the white men came to America the Red Indians used to hack this spot out with great care and trouble, smooth and drill it, and make it into a bead. Strings of these beads formed their money. The white people soon found the art of cutting the wampum-spots out with a drill, and thus had an immense advantage over the poor Indians in producing their own currency. Until within a few years there were one or two villages on the Hudson river above New York, where wampum was still manufactured to be sent to the north-west coast, where there are savage tribes still in the stone age. If you will buy a ten shilling circular drill and get some American oyster-shells and a file, you may easily make wampum beads for yourself. They are of a pretty colour, and look well when nicely finished.

A quaint and pretty kind of beads bearing a perfect resemblance to the Egyptian mummy bugle-beads, which are so popular and so very expensive, may be very easily made at almost no expense beyond work and tools. Get a quantity of broken pipe-stems—any tobacconist will probably give them to you—and divide them into lengths of an inch, rounding the ends with file and glass-paper. This work can be done by children very rapidly. A grindstone is even better

than a file. Now for colouring them. The refuse from gas-works, which costs nothing, and which is often used to throw on gravel walks to kill weeds, communicates even to flints an indelible *bleu de Nil*, or beautiful greenish blue colour, exactly suitable to make "Egyptian" beads. Or you may stain them in any other indelible dye you please. All aniline colours fix firmly on the *terra-cotta*. Several strings of these greenish-blue beads eked out with a few small Egyptian idols of the same colour make a very good ornament.

Very curious toys can be made by picking out from the flint nodules or masses which are found in the chalk, and which abound on the English coasts, those which bear some slight resemblance to animals, fishes, birds, or monsters, and eking out the resemblance by painting and varnishing them. A great many of these have a rounded end, somewhat resembling an animal's head, and this with eyes and nose, &c., painted on it, is often droll enough. A large white flint pebble, or, indeed, an oval pebble of any kind, may be painted in oil and varnished, to serve as a paper weight. I have found that there is always such a demand for these painted grotesque flints, that I have no doubt that they would meet with a ready sale at shops in watering-places such as Hastings and Brighton.

If you can obtain twisted and gnarled boughs and roots of shrubs such as gorse and old thorn bush, or in America those of the wild laurel, you may, by cutting and adapting them, make from them very pretty rustic baskets suitable for hanging up and

containing flowers or plants. No description can teach the art, which depends on an eye for detecting the curves and branches of the shrubs, but as a general rule you can make a ring of any two bent sticks of nearly the same appearance and size.

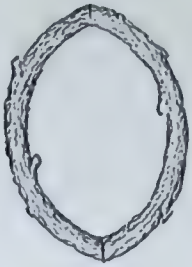

FIG. 74.

Fasten the ends together either with nails or by notching and tying. Now take another half circular twig, and affix its ends to where the others meet.

FIG. 75.

You now get two sticks which are quarter circles, and join them so as to make a semicircle intersecting the last one described. You will now have the skeleton of a basket. If any of the sticks have branches these may aid in forming a portion of the whole; if not, you must continue to work in curved bits until it is complete. A semicircular curve

forms the handle. When varnished these baskets are very pretty. Black varnish may be used with effect.

A pretty rustic picture-frame may be very easily made from any curved stick with or without the bark. Take such a twig and saw it in two longitudinally. Then shape the ends into fitness, and join them with screws and glue, and varnish it.

FIG. 76.

These frames are very effective, and if you possess or can have the use of a revolving circular saw, you will be able to manufacture perhaps a hundred in a day if you have the crooked sticks ready. It will not be necessary to cut a tenon-bed to hold the glass. Four nails, each surrounded by a small round piece or cylinder of gutta percha, vulcanised rubber, or sole leather, will serve at the same time to secure and protect the glass and the thin board at the back.

A young tree, generally a fir, with many boughs,

if stripped of its bark, set in a base and varnished, makes an admirable round rack for a bedroom in a shooting box or cottage. We often see horns so mounted as to serve for clothes racks, but boughs may be found which, set in shields, would answer the same purpose and look very well.

I once knew a poor man in America who had collected hundreds of jasper arrow-heads, such as were once used by the Red Indians, and which abound in certain localities. These he had flattened on one side with an ordinary grindstone, and after polishing them with emery had set them, by simply imbedding them in a cabinet. The effect was very good, but it can be also made by taking flat and oval or round flint pebbles, grinding them in like manner, and setting them in picture-frames, cabinets, and other articles. On many of the English beaches pebbles may be found in great variety, which even without polishing are perfectly adapted to be thus utilised. To set them, lay the pebble on the wood, and draw with a pin a line of exactly its periphery. Cut the wood away till the pebble fits, and then, after coating the inside of the cutting with glue, set it. White and black flint pebbles, jaspers, common carnelians and ordinary agates such as may be picked up by scores in an afternoon at Aberystwith, Chesil Beach, and Lowestoft, are perfectly adapted to such fancy work. They often look better in the rough for such inlaying than when perfectly polished. It is difficult to give by description an idea of the appearance of furniture thus adorned, but the reader may readily find by experiment that it is truly attractive.

The reader has doubtless seen the seats, cabinets, looking-glasses, and other objects inlaid with small squares and triangles of mother-of-pearl which come from Constantinople and Cairo. They look very well indeed, and seem to be difficult to make, but are in reality very easy to manufacture, as I know by experience, having taken lessons in the art from old Hassan, a Cairene inlayer. I do not know where the mother-of-pearl squares, diamonds, and triangles can be obtained in London, but Abraham Eskenazi, No. 18, Mortimer Street, Cavendish Square, will always obtain you any quantity at a fair price from the East. To set a single piece or a simple row of diamonds or double triangles in wood it is only necessary to

FIG. 77.

sink a groove, the thickness of the triangles, by cutting with a chisel; then coat it thinly with best glue in which nitric acid has been infused, or with cement made of mastic and isinglass with spirits. In the same manner attach the pieces when a broad field is to be covered. You can inlay in ivory in the same manner. Get some old thin counters or thin pieces of sheet ivory of any kind; you can often find bits suitable for your purpose at an ivory turner's at a cheap rate. Mark any pattern on them which you like, and then, either with fret-saw, knife, or chisel, cut it out. Lay the piece thus cut on the wood, scratch the outline with a pin, or mark it very accurately with a very sharp hard pencil, and

cut it out as before. Fasten the pattern in with glue, into which Venice turpentine has been infused. Dark walnut or ebony, or ebonised mahogany thus inlaid is very beautiful. A simple ivy leaf pattern is very effective. With a little practice this work is easy and very rapid of execution, and is profitable. Inlaying of wood or marqueterie is effected by sawing out with a fret-saw patterns from very thin wood and setting them in another bed. The labour and material may be economised by sawing, let us say, a leaf at one cutting both from an ebony and walnut board and fitting the ebony flower into the walnut space, and *vice versâ*.

Varnish is not as yet much used in Europe as a plastic material, but in the East it is extensively employed in many ways never seen here. The beautiful Bombay red ware is made by a curious process. A basket is coated with clay, and this again with black thickened varnish. Before this is quite dry, it is worked up with combs and stamps into certain patterns, and when dry is coated with a red cement-varnish which is in turn brushed away so as only to remain in the crevices of the dried black varnish, and thus make a contrast.

Horn-work, now so much neglected, was once carried to a high pitch of decorative art, and it would be worth while to revive it. An ordinary ox horn with a light ground is the best to experiment on. The simplest method of designing patterns on them is with a hot iron or with sulphuric acid, and I have seen some executed by South American sailors and guachos which were in their way tasteful. They

may also be etched by coating them with wax or varnish, and after scratching out the pattern pouring acid and water on them. This is very easy of execution and the effect is very fine. It is almost needless to say that indelible inks and stains may be employed, and that a horn with black and brown, or black and grey patterns, well executed, is an elegant ornament for any room. Mounted in silver they form acceptable gifts or testimonials. Another way to adorn them is to design a pattern on them in lines and with ink. Then with a very small sharp gouge or V tool (*vide* Wood-carving) cut these lines in fine grooves. When finished, take a small camel's hair pencil and fill the grooves with indelible ink or any other dye. As the Irish Anglo-Saxons and Danes attached great value to drinking-horns, and excelled in ornamenting them, I recommend Celtic, and Saxon, or Norse patterns as appropriate for such work. If a horn be steeped some time in hot water it will become soft, and in this state may be flattened, as we see the Scotch powder-horns. These of course present a more favourable surface for artistic work; it being much more difficult to draw or etch on a round object than on a flat one. Horn is in fact easily reducible to a perfectly plastic substance, in which state it may be moulded into any shape. Polishing the horn can be accomplished with powdered pumice and water; use fine sand-paper first, and finish off with fine whiting and water. Use a stiff brush for the pumice and a soft one for the whiting; circular brushes on a lathe are best. If the parts are flat, you may use a piece of leather glued on a stick (called a buff).

If you take any piece of rough wood, let us say a twig with the bark, and lightly coat it with varnish or glue, and then press on it and into it with care a piece of tin-foil, it will appear as if silvered. Thus the rustic picture-frames of wood which I have described in this chapter, may be coated with tin-foil so as to present a very pretty appearance. Three such sticks, each two feet in length, united by being inserted in holes in a wooden triangle, only being tied or wired to a triangle of three smaller sticks, make a tripod like that used by gipsies in the olden times for hanging the kettle. From this stick tripod, which is to be covered with tin-foil, a basket or shell for flowers may hang.

A curious and amusing rustic harp, which may very well be played on, is easily made in the following manner. Get a curved bough which somewhat inclines to the harp in shape, and saw it in two longitudinally. Then hollow out the halves with a gouge, and join them with glue. Let the pegs on which the strings are wound pass through the arm. They can pass at the base through holes in permanent pegs.

It is needless to say that such a harp does not form a perfect instrument, but it can be made to yield pleasant sounds to ears not over-nice, and it forms, according to the bough, a pretty rustic ornament. A bough projecting from a trunk often forms a tolerably close resemblance to a harp.

People are not so generally aware in England as they are in India that glass can be cut and worked with tolerable facility after a little practice, with a file

dipped in turpentine. The result is that many goblets or decanters, which might still be converted into objects of use or ornament, are with us, thrown away when partly fractured. I have seen both

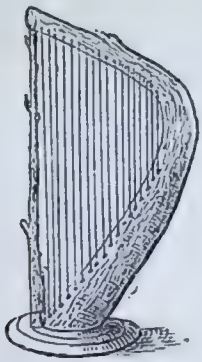

FIG. 78.

graceful and useful objects which had been made from such injured articles. Thus a tumbler which has had a piece broken from the rim may be cut down into a glass cup more suitable for holding water for painting than the original tumbler; and a decanter, the neck of which has been broken, often makes a very fair goblet. Sharp files, turpentine, and glass- or emery paper are all that is needed. Of course a glazier's diamond, or a shilling hard-steel American glass-cutter will be of great assistance in beginning the work.

In thus cutting glass, dip the file—which should be sharp-edged and pointed—into the turpentine, keeping the point of the friction constantly wet with the same liquid. The glass may also be easily bored, either

with the point of the file or with a drill in the same manner, with turpentine, and the same process is applicable to quartz, pebbles, &c. By this method there is no danger of cracking the glass. In drilling a glass bead, you may make a hole in a pine stick and set the bead in with wax or cement. Pebbles in grinding are held by fastening them to the end of a stick with cement.

I have seen a very good dinner-bell, which had a clear tone, and which was contrived by an officer when stationed on the plains of western America. The bottom of a champagne bottle had been cut away by tying a yarn string, saturated with spirits of turpentine around it. When the glass had become hot, in a line, the bottom was sharply rapped with wood, and fell off. The edge was then smoothed, and a very heavy nail or small bolt suspended within. This nail had a string fastened to its point, one end of which string passed through the cork. A bullet suspended from a cord inside the bottle also serves for a clapper. Considering the cheapness and excellence of these bottle-bells, it might be worth while for some dealer in novelties to make and sell them.

Baskets, screens, and a great variety of fancy work can be made with the rattan or cane used for covering chairs. It is simply rendered pliable by steaming, and while in this condition it may be laced up to any desired shape. It is easily split, by fixing a sharp blade in a board and drawing it through a staple. Any chair-mender will teach you how to do this. The ends are kept in place with fine nails or wire.

The negroes in America make door-mats superior

to most of the "manufactured" articles, by a very simple process. Take a piece of coarse canvas, and then taking rope—of which the Manilla, or sea-grass kind is the best—cut it into lengths of four inches and unravel them. Then with a bone instrument like the point of a horn, about four inches in length, or with

Fig. 79.

a pointed stick, open the canvas, or make a hole between the threads, roll the fibre to a point, and pull it through. Then open the next, interlacing in like manner, and pull the other end through it. When the mat is thus completed bind the edges, and smooth the whole with shears. Patterns are introduced with dyed wool or other stuffs.

CHAPTER X.

USEFUL RECIPES.

THE following recipes will be found useful in the practice of many arts:—

Cements. — The so-called diamond or Turkish cement, by which precious stones adhere to metal, is made as follows:—Take of isinglass two drachms, wet it with water, and let it stand till softened, then add as much proof spirit as will rather more than cover it, and dissolve with a moderate heat. Take of gum mastic one drachm, dissolve it in two and a half drachms of rectified spirit. Mix the two solutions, and stir in one drachm of gum-ammoniacum in a fine powder and rubbed down with a little water. Keep it corked in a bottle. When required for use, put the bottle in warm water, and apply the cement with a brush to the china or other substance,

which should have been previously warmed. Use a very thin layer.

For mending alabaster and marble ornaments, white resin and white bees-wax melted and mingled with either plaster of Paris, baryta, calcined magnesia, or any other white mineral powder, forms a good cement.

The white of eggs, thickened with powdered quick-lime and made with *hot water*, may be used for repairing broken china, glass, or marble.

A very good transparent cement for glass is made in America by dissolving one part of India-rubber in chloroform, and adding sixteen parts (by measure) of best gum mastic in powder. Digest for two days and frequently shake the mixture. Apply with a fine camel's-hair pencil. This cement may be used for making gold and glass mosaic squares.

Gum arabic solution, combined with plaster of Paris alone, or any white mineral powder, is a very readily made and excellent cement for mending glass, or causing any substances to adhere.

A very strong cement for repairing or restoring gutters or drain-pipes is made of two parts of common pitch melted with one of gutta-percha. Carefully prepared, it is applicable to wood, glass, ivory, leather, and many other substances.

Gum mastic, white of eggs, and lime form a very hard cement.

A transparent cement is made by dissolving isinglass in alcohol and adding gum-ammoniac.

I was told by a Polish chemist that in India a strong cement is made by mixing old cheese with strong saturated solution of borax. It makes a hard

artificial stone. I have however found by experiment with several French recipes into which cheese or caseine or curd and lime entered, that while they set hard, they almost invariably cracked. Different forms of ammonia occur continually in recipes as a solvent. In an old Latin book (Mizaldus, *Memorab.* Cent. 1566) it is asserted that artificial coral may be made by steeping hart's horn reduced to powder in a very strong ley, made from ash-wood ashes. Steep for fifteen days, colour with infusion of vermilion, and dry by a gentle fire. As described, this would not produce the result. The writer probably meant a combination of ammonia and vermilion, possibly with ashes. I have read that if a piece of copper be dissolved in ammonia, a solvent may be made by which powerful cements may be formed when it is combined with any fibrous substance, such as wood or cotton. Hydriodide of ammonia is a powerful solvent for many mineral substances. It is remarkable that the old alchemists declared ammonia to be a needful ingredient in the "alkahest," or universal solvent.

Litharge and glycerine make a strong waterproof cement, which may be used for many purposes, especially for mending crockery, or iron pots, and filling in holes and crevices. It will resist hot water.

Ordinary glue acquires additional strength by the addition of finely-sifted wood-ashes, which must be gradually poured in and mixed.

A very powerful jewellers' glue is made as follows:—One kilogramme glue, sixty-two grammes gum ammoniac, sixty-two grammes sulphuric acid. The

glue and gum are dissolved to equal volumes at boiling heat, and the sulphuric acid added.

Red cement is employed to make glass adhere to metal, and is very useful. It can be made by melting five parts of black resin, one part of yellow wax, and then gradually stirring in one part of yellow ochre, or Venetian red in fine powder, which has been *well* dried. The objects to which it is to be applied should have been previously warmed, and it must also be melted before use.

Asbestos powder made into a thick paste with liquid silicate of soda forms an extremely hard cement, which sets very quickly, stands any heat, and is not acted on by ordinary acids.

Ivory which has lost its colour may be restored without danger of cracking by exposing it *under a glass* to the rays of the sun. When dried and decayed by age, so as to be in danger of perishing at a touch, it may be made to recover its original firmness by gently boiling it for some hours in a solution of gelatine. It may, if thin, be made soft and translucent by laying it in phosphoric acid of moderate strength, drying it in pure linen, previously rinsing it in water. When dry it will be translucent and hard, but it may be softened again by dipping in warm water and milk. The time of immersion in the acid differs with different pieces of ivory, and if certain parts are to retain their original character, they should be covered with varnish before immersion. I have not tested horn with phosphoric acid, but should deem it probable that it could be reduced to a soft paste by it, and hardened by drying.

To gild Steel.—Make a neutral solution of gold in *aqua regia* (nitro-muriatic acid), and pour into it a quantity of sulphuric ether, which will take up the gold and float upon the denser acid. The article is then to be washed with this auriferous ether, that is to say, it is to be painted on with a hair-pencil. The ether now flies off and the gold adheres.

Many persons would willingly work in caoutchouc, or india-rubber, but are deterred by the smell which adheres to the articles when made. If they are laid between two thin layers of charcoal and exposed to a temperature of about one hundred and sixty degrees for from three to six hours, according to their thickness, they will be found entirely devoid of smell. Repeat the operation if any smell by chance is still perceptible.

Glue may be deprived of its greatest fault—a tendency to crack—by mixing it with glycerine. A German chemist, named Puscher, a native of Nuremberg, reported to the Trades Union of that place in 1866 that he met with great success in using glycerine together with glue. While generally, after the drying of the glue, the thing to which it is applied is liable to break, crack, tear, or spring off, if a quantity of glycerine equal to a quarter of the quantity of glue be mixed together, that defect will entirely disappear. Puscher also made use of this glue for lining leather, making globe frames, and for smoothing parchment and chalk paper. He also used it for polishing, mixing wax with the glycerine, and using it as an underground for laying on aniline red colour. The red was found to exceed all ethers in which glycerine is not

fused. The glycerine has also some properties in common with India-rubber, for it will blot out pencil-marks from paper, so as to leave no marks whatever. A paste made of starch, glycerine, and gypsum will maintain its plasticity and adhesiveness longer than any other cement, and therefore recommends itself for cementing chemical instruments and apparatus used by pharmacists.

Celluloid or artificial ivory is prepared, according to a contributor to *Design and Work*, by subjecting ordinary paper or cotton to the action of a mixture of nitric and sulphuric acids, washing this till all trace of acid disappears, drying the product, powdering the same, and mixing it with camphor; drying and repeatedly pressing this mixture, at last applying heat, when the celluloid appears in the form of transparent elastic rods or slabs. This makes a beautiful and almost perfect imitation of ivory. The well-known so-called *coralline* beads are made of coloured celluloid.

Fictile ivory is made by closely mixing and passing through a fine sieve superfine plaster of Paris and yellow ochre, half an ounce of the latter to a pound of plaster. The cast made from this is thoroughly dried by both air and an oven, and then soaked for fifteen minutes in a mixture of spermaceti, white wax and stearine, equal parts, and melted. Artificial ivory may also be made by adding very finely-powdered egg-shells to a paste made of isinglass dissolved in brandy. This may be tinted to any shade and moulded to every shape. The moulds should be oiled.

Billiard-balls resembling ivory have been made in

Paris from fine paper pulp carefully mingled with gelatine. Baryta improves the colour and adds to the density.

To obtain that beautiful deep black polish on iron or steel or brass which is so much sought after, it is required to boil one part of sulphur in ten parts of oil of turpentine, the product of which is a brown sulphurous oil of disagreeable smell. This should be put on the outside as slightly as possible, and heated over a spirit-lamp till the required black polish is obtained.

You may often wish to transfer an engraving to wood or a pen drawing in India-ink. It may also be put on china by the same chemical agency:—"Take a saturated alcoholic solution of potash, pour the solution on the engraving, and immediately remove all the superfluous liquid by means of blotting-paper. Lay the engraving on the wood to which it is to be transferred, and place it in a press—a copper-plate press is the best. The transfer will be obtained immediately. The engraving must be immersed in clean cold water, after removal from the potash bath. The wood block should be moistened on the back to prevent warping. Another plan practised by engravers is to soak the impression to be transferred in oil of rhodium, thyme, or creosote, so as to soften the ink. It is then placed upon the wood block, face downwards, and the transfer obtained by rubbing the impression with an ivory or bone burnisher, until the subject has 'set-off.'"—*Design and Work.*

Cementing Metal to Glass.—A great deal of difficulty is experienced in cementing metal to glass

The *Faerber Zeitung* says that a mixture of two parts finely ground litharge and one part white-lead, and working it up to a stiff paste with three parts boiled oil and one part copal varnish, adding more litharge and white-lead as required, is the best material for joining the two substances. To fasten metal to leather, or *vice versâ*, soak the leather in a hot solution of nut-galls and apply it to the metal upon which it is to be fastened, having first given the metal a coat of glue. When dry, the leather will tear sooner than be torn from the metal.

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